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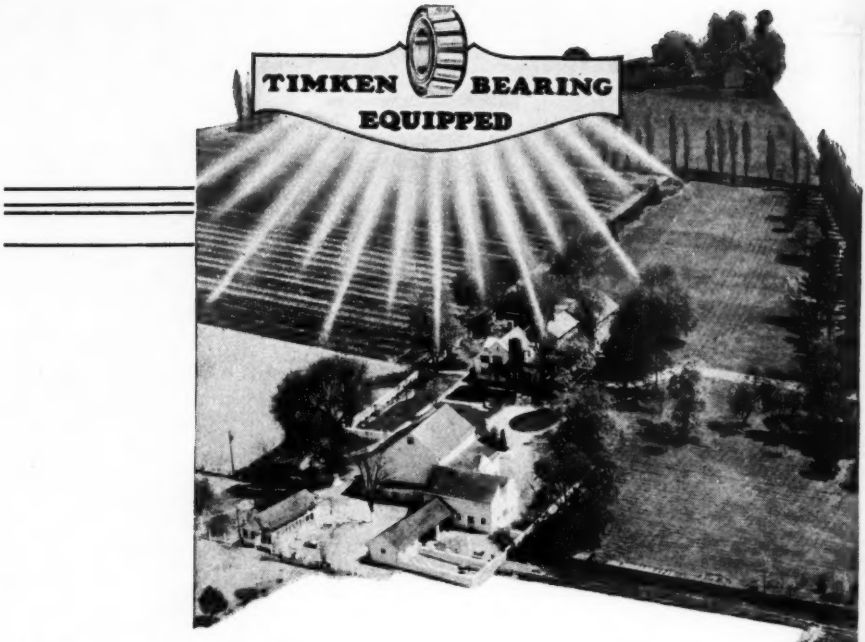

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The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*

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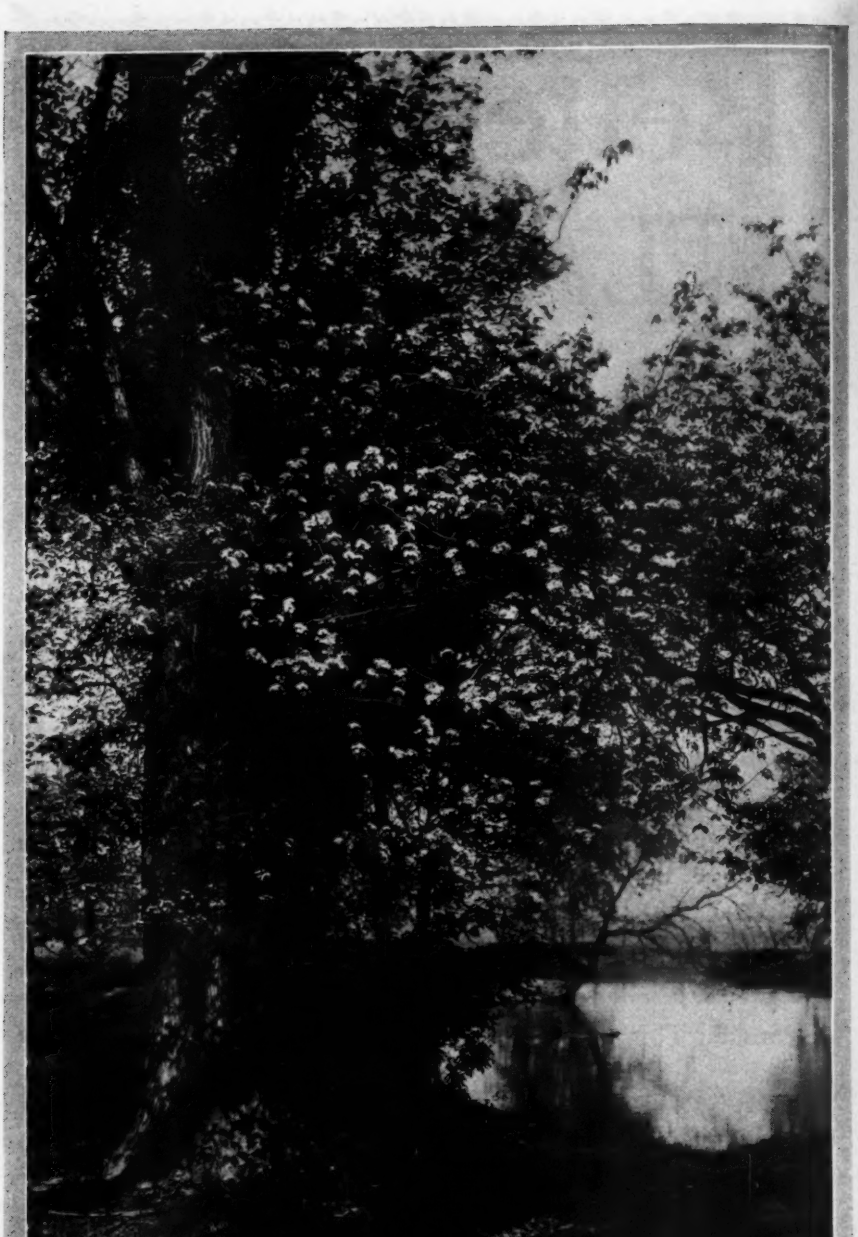

MAY INVITES

Better Crops with PLANT FOOD

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Jeff recalls the days of—

Slow Motion

By Jeff McDermid

"I'LL wager a tire against a horse collar that you haven't had a buggy ride in fifteen years," said my neighbor, who is also a small town product and the owner of an accident policy and a misused car.

His bet was not accepted. I could not have won it, nor could I have produced the horse collar. I doubt if I could find a shop in our town where horse collars are sold.

"I have stumped you, as I supposed," he continued, entering my galvanized garage and seating himself on an oil keg.

"I see you have been tinkering with your engine again," he remarked. "That makes me think of another poser for you. The human memory is a very ephemeral thing, Jeff. You and I were brought up to admire good driving horses and we did our courting in carriages, but I am positive that all these motor mechanics have driven away all the horse sense you ever had! I'll bet you couldn't write a piece for your paper about the details and incidents of those good old days when Dobbin was your only means of departure!"

Since my neighbor is a surgeon whose practice has expanded somewhat with the evolution of the automobile, he commands my respect. So greatly did his challenge impress and

stimulate me that I have tried to conjure up the vanished vehicles of the nineties, when he and I and so many of the rest of us were young. I will show Old Doc that I have not forgotten!

REMEMBER how we used to play at going riding in the old carriage shed on rainy summer afternoons? I recollect that there were eighteen separate tasseled cords on the front edge of the canopy top "carry-all" and fifty-two of those "do-dads" along each side. The whip socket on the right-hand side of the dashboard was wrapped in cracked patent leather; the dashboard was glazed in crinkley pattern; the velvet cushions had a few holes in them that exposed the cotton stuffing; and the whiffletrees creaked when you jerked the ropes on them in imitation of Father en route to a funeral.

I do not recall whether we had then learned to love The Deacon's One Hoss Shay, but the phaeton we played in—and sometimes really rode in—was just shakily, drowsily romantic enough to match my conceptions of the equipage of a mellow New England squire. You could lean back in the padded seat and plant your new boots straight out ahead for admiring inspection, with room enough between your feet and the high curving dashboard for the picnic lunch basket or the crate of eggs bound for market.

Make-believe sleigh riding did not come so handy, because it was customary to unfasten the thills and their resonant bells and suspend them from the ceiling out of the damp and mold, leaving the cutter bereft of much wintry suggestiveness. The buffalo robes were absent, too, having found summer hibernation in Mother's closet, packed in moth-balls. Thus the cutter called for a too finely strained imagination, and besides, it was usually filled with the chaff and litter of hens' nests. The sleigh ride simply could not be staged impromptu, while the carry-all and the phaeton were always beckoning to visionary "joy rides" long before that word was coined.

No deterring parental command was ever issued in the dark ages of the horse-drawn vehicle to caution us youngsters concerning possible serious accidents due to sudden application of power or the impairment of motive processes. True, we had to obey the injunction not to "monkey" with the phaeton lamps or fuss around in the wrench-box at the rear, and the girls had to be careful not to get axle-grease on their dresses. The whip, of course, must be returned to its socket after our stationary outings, for the whip was often the starter and the accelerator of those innocent days. He who attempted to drive old Major up Gay's Hill minus any instrument of urging would be likely to lose his appointment and his temper.

THOSE who drove without whips were the stock-buyers and the delivery boys, and we never owned their kind of horses or boasted their vocabulary. Our motive power came fresh from the plow and the driver of our carriage was frequently too weary from the same task to stop and cut a switch from the willows. So the buggy whip, with its bent and frayed tip, must remain in the accustomed place, or no more play-days for us in the family conveyances!

Thanks to the reliability of my auto-engine and the generous supply of Dutch-Colonial gas stations, my son has never taken a journey in a horse-drawn vehicle. He has seen a few of them faring cautiously along on the extreme outer fringes of our concrete highways, but strange to say, the anxious expression of their drivers has never appealed to him as a source of new thrills. Modern youth prefers to remain on the offensive side of exciting things.

(*Turn to page* 60)

Left: A check plot of corn on peat soil to which no fertilizer has been applied.

Below: The effect of superphosphate and muriate of potash on producing corn on peat soil.

Peat *and* Alkali Soils *in* Iowa

By L. R. Combs

Extension Editor, Iowa State College

ADEQUATE drainage, proper cultivation and cropping, and the judicious use of either superphosphate, muriate of potash, or a combination of both will enable farmers who have peat or alkali soils on their farms to put that land into a profitable state of production, judging from the experiences of Iowa farmers who have been cooperating with the Iowa Experiment Station. The futility of attempting to grow crops on peat or alkali soils without special methods of treatment aimed at reclamation of the land has been experienced by hundreds of farmers who live in areas where these soils exist.

The so-called alkali spots usually do not appear until after a peat bog has been drained. Then they appear in what might have been the bank of the slough. Alkali soil contains an excess of soluble salts in the soil water and is a result, usually, of poor drainage around the edge of the peat area where the salts have collected for years.

Peat deposits range from a few inches to two or three feet deep in what are called the shallow peat areas up to 20 feet in the deep peats. The suggestions for handling peat soils given herein are largely for the shallow peats.

Adequate drainage of peat soils is the first and most important step in reclaiming the area, which may vary from one to several hundred acres, according to J. L. Boatman, extension specialist in soils at Iowa State College. Mr. Boatman, W. H. Stevenson, head of the soils department, and Dr. P. E. Brown, also of the soils department, have compiled the results of their studies of peat soils in a recent bulletin. Proper cropping, plowing, fertilization and other treatments, although highly important, will be

useless until drainage is accomplished.

After the soil is properly drained, the preparation of it for growing the crop is important. Fall plowing is desirable as the soil is exposed to the action of the rain, snow, and frost during the winter months. This action aids in the decomposition of the peat. The more rapid the decomposition of the peat, the more quickly the land will be made satisfactorily productive, points out Mr. Boatman. Fall plowed peat land may be worked earlier in the spring, giving opportunity to prepare a better seedbed.

Need Proper Fitting

Deep plowing of peat soils is recommended by the Iowa State College men. This is especially desirable if the peat is shallow and it is possible to mix some of the clay in with the peat. This improves the physical condition of the peat and brings up plant food from the clay to be made available for crop growth. Even where peat is deep, deep plowing is advantageous as more of the top layer is opened to the air and decomposition is hastened.

Rolling often improves the condition of the deep peats. Rolling compacts the soil and a firmer seedbed is secured. For shallow peat soils the rolling is of less value and on peats of less than 8 to 10 inches may compact them too much and retard their decay. Frequent cultivation of peat soils is desirable as it opens them up and hastens the processes of decay. Cultivation also keeps down weeds, which is important on newly drained peats.

Application of fertilizer will be found advantageous after the peat soil has been properly drained and prepared for cultivation, says Mr. Boatman. Manuring is of little value on peat soils. The addition of organic matter and nitrogen is not necessary as the peat soil contains an abundance of these constituents. A small amount of manure might be of value on newly drained peat soils because of the introduction of microorganisms which aid in the process of decay; new peat soils are deficient in these bacteria. Too much manure will be detrimental and may retard crop maturity. Peat land, at least in Iowa, is high in lime content and application of limestone therefore is not necessary.

Need Phosphorus and Potash

Peat soils are, however, low in phosphorus and potassium content and tests indicate that these fertilizers can be used to advantage. Superphosphate and the sulphate or muriate of potash have been used with a resulting increase in crop yields.

Superphosphate and muriate of potash applied at the rate of 200 pounds per acre were tested on nine different fields in Iowa. Check plots which were untreated produced an average of 34.2 bushels of corn per acre on the nine peat fields. The average corn yield on the peat soil treated with superphosphate was 41.8

The corn grown without fertilizer sorted—(Left) 59 per cent soft and unmarketable; (Right) 41 per cent sound and marketable. When fertilizer was used, the corn was 90 per cent sound and only 10 per cent soft and unmarketable.

This peat bed can be brought into profitable production by drainage, good tillage, and the use of fertilizer.

bushels per acre and on that treated with muriate of potash, 43.1 bushels. The largest yield was obtained when 200 pounds each of potash and phosphate were spread on the land. This treatment resulted in an average yield on the nine plots of 54.1 bushels per acre. These nine fields included several depths of peat soil.

The corn which was grown on the untreated peat soil was from 33 to 95 per cent soft, that is, unmarketable because of high moisture content, immaturity, and poor quality. This reduced the yield of usable corn in many cases to as low as two to four bushels an acre.

On one field, in Story county, where the peat ranged from two to four feet in depth, superphosphate gave the highest yield of any treatment, 50.1 bushels. Only 10 per cent of the corn raised on the phosphated plot was soft. The check plot yielded 30.7 bushels, but 59 per cent of the corn was soft. Muriate of potash applied to one plot resulted in a yield of 28.8 bushels of corn of which 50 per cent was soft. Corn on the plot treated with both phosphate and potash yielded 42.5 bushels an acre with only 10 per cent soft.

This Story county plot was an abnormal case. In most cases the fertilizers all gave increased yield above the check plot although in all cases the same fertilizer did not result in the greatest increase. The most efficient treatments vary with different localities and the college men suggest that farmers make tests of their own to determine which should be used in their particular cases. These tests can be made by dividing peat fields into four small areas and leaving one without treatment. The others are treated, one with superphosphate, another with muriate of potash, and the other one with a combination of the two.

The fertilizers are applied at the rate of 200 pounds per acre in each case, 200 pounds of each being used in the combination treatment. The yields resulting from the different treatments may be observed and the best treatment for that farm adopted. The quality of the corn resulting from each treatment should also be taken into account.

In an experiment in Kossuth county superhposphate and muriate of potash gave about equal increases in yield, but the quality of the corn was much better on the phosphated plot. In most cases the phosphorus seemed to result in better quality corn being produced and in only a few cases did the potash result in higher yields than the phosphate.

Grow Good Oats

The most striking gain in yield due to application of both superphosphate and muriate of potash was in an oats

field in Worth county. The check plot yielded 7.5 bushels of oats. The phosphated plot yielded 17.5 bushels of oats and the plot treated with potash yielded 47.5 bushels, a yield decidedly in favor of potash. But the plot treated with both fertilizers yielded 80 bushels, more than 10 times as much as the non-treated plot. In this field oats was seeded with sweet clover. Practically no stand of clover was secured on the untreated plot. A 50 per cent stand was secured on the phosphate plot; 75 per cent on the muriate of potash; and a nearly perfect stand on the plot treated with both.

Fertilizer treatments on peat land which has been pastured for a number of years frequently have little effect the first year, results of the experiment show. In Kossuth county a field where the peat soil varied from 18 inches to three feet in depth and which had been pastured for a number of years was treated. Little increase in yield of corn was secured on the phosphate or potash plots, but a combination of the two resulted in a yield of 52.7 bushels, an increase of 12.7 bushels more than the check plot. After the first year or two, however, the increases in yields on the single-treatment plots are more noticeable.

Potash Doubled Potato Yield

The potato yield on a field in Kossuth county was more then doubled by the addition of muriate of potash. The check plot yielded 89 bushels. The one treated with potash, the only treatment tested on potatoes, gave a yield of 186 bushels of potatoes of larger size and of higher quality than those raised on the check plot.

These results as a whole, points out Mr. Boatman, show that usually yields on peat soils are improved by an application of 200 pounds of superphosphate and that in many cases the addition of 200 pounds each of phosphate and muriate of potash is of great value. In fewer instances the application of potash alone gave the best results. Wherever there is variation in the peat, there will be variation in the response to fertilizers, he explains. Where there is a surface layer of 12 to 14 inches of well-decomposed peat, the need for potash is much less evident. Potash gives the best results on areas where the peat is quite raw and undecomposed. Application of superphosphate is desirable on practically all peat soils.

The growing of corn and small grains on newly drained peat soils may prove disappointing, Mr. Boatman says. The best crop to seed probably is a mixture of timothy and alsike clover. The crop may be cut for hay, but it is better to pasture it as the tramping will compact the soil. After two or three years of pasturing, corn and small grains, with proper fertilizer, should grow well. If the peat is well decomposed, corn and small grains may be grown immediately with proper fertilization.

The growing of vegetable crops will prove profitable on reclaimed peat land if markets are accessible and labor conditions permit. Onions, celery, potatoes, and tomatoes give good yields on peat land if it is first treated with 200 pounds each of muriate of potash and superphosphate.

Alkali Easily Detected

Alkali spots which frequently appear following the drainage of a peat area are identified by a whitish deposit on the surface of the ground. It may have the appearance of having been strewn with a fine white powder. The soluble salts remain in solution until after the land is drained and the surplus water withdrawn. The salts are brought to the surface then by water which evaporates.

Drainage is essential for washing away the excess of soluble salts which are causing the difficulty, says Mr. Boatman. It is desirable that two lines of tile be laid around the pond or slough at the edges of the water lines, thus passing through the area

(*Turn to page* 53)

Legumes Bring PROSPERITY

By C. A. LeClair

St. Louis, Missouri

RELATIVITY is a word that gained a new significance when the great physicist Einstein used it to show the interdependence of certain laws of nature. The same word equally can be applied to the surplus crop situation of this country and its remedy.

Farmers of this nation have produced surplus crops of corn, wheat, and cotton more or less consistently in the past few years. Yet, during the same period on eight farms out of ten the livestock have actually gone hungry for at least a part of each year. This anomaly or paradox originates from the fact that no amount of grain without supplementary high protein roughage will provide an adequate ration for dairy cows, fattening steers or hogs.

Our production of quality legume hay has been consistently short of our optimum requirements. This has prevented a large per cent of the livestock from producing milk or meat economically during the late winter and early spring months prior to spring pastures being available. Then several more weeks are required after these animals have access to spring pastures before they are again in condition to produce with profit. If this costly situation did not cut so deeply into the returns of farmers generally, it would be easier to understand why such circumstances have not been corrected before now.

To grow more acres of grain than can be economically consumed and at the same time be obliged to purchase large amounts of protein concentrates that can well be grown on the same acres is certainly not good business. Yet that is what nine out of ten farmers have been doing.

On the other hand, when farmers of the North reduce their grain acreage 20 per cent and increase proportionately their seedings to clover, alfalfa, and soybeans and as soon as Southern farmers plant one-fifth less cotton and put these acres into corn

Young soybean plants, showing how early the nitrogen-gathering nodules begin to form.

or cowpeas there will not be the problem of over-production.

Of course, it is easier to grow fair crops of corn and cotton than it is to establish productive fields of legumes. Yet the extra effort and investment required to grow high protein feed crops pays proportionately.

Progress Being Made

Never before has there been so marked a readjustment of cropped acres as there has been this year. It is cash crops to replace small grains and cotton that are now getting special attention. Farmers everywhere have become legume conscious. They are not only planting more acres of clover and alfalfa this year, but likewise more acres of soybeans and cowpeas are being planted both in the North and South.

For instance, thousands of acres of alfalfa have been added to the normal acreage in North Dakota. South Dakota has increased its acreage of sweet clover this season more than 300,000 acres. Twenty per cent more cowpeas are being planted in the Southern States, it is reported, while Illinois and adjoining States have increased the soybean acreage to a similar degree. Again, such extensive farmers as Campbell of Montana, who is the biggest wheat grower in the world, operating 150 square miles of land, planned to materially cut his spring wheat acreage in favor of beans and flax. Likewise, Iowa farmers in all parts of that great State have extended their legume acreage. The agricultural extension forces of Missouri have also inaugurated a clover and prosperity campaign which has done a great deal to materially increase the income of farmers of that commonwealth.

In the light of the present awakening to the possibilities of extending the acreage of legumes for greater profits, it is surprising that this means of agricultural relief has so long been overlooked. We have never had an over-production of quality legume hay or seed. On the other hand, we have been obliged to import both soybean seed and oil from abroad. More than 500,000,000 pounds of soybean oil were imported last year. The many new uses to which this product is being put constantly increases so that its culture assures a healthy demand in the future. Even under present market conditions with yields running from 15 to 25 bushels to the acre, soybeans bring acre returns that in most cases surpass what can be obtained from corn and small grains.

Considering the culture of soybeans aside from the direct profits they offer as a seed crop, their value for feeding purposes is equally good. As a source of rich protein, the crushed beans or hay provide an excellent supplement to any ration.

When one realizes that farm profits represent what is taken in over and above out-of-pocket expenditures for supplies, equipment, taxes, and labor, the advantage of employing legumes to reduce feed bills is apparent.

Another big advantage that accrues from the culture of soybeans is that like the clovers, alfalfa, and other legumes, they improve the tilth of the soil. Proof of this is evidenced by results observed by the Illinois Agricultural Experiment Station where it was found that the presence of this crop in a rotation increased the yield of corn 10 bushels to the acre. Other State Agricultural Experiment Stations report that soybeans in rotation produced as much as 6 more bushels of wheat and 17 more bushels of oats when these crops follow in rotation.

Down in the Southland at the Branch Experiment Station of Arkansas, cotton following soybeans planted in the proceeding corn crop produced 50 per cent more lint to the acre.

However, to get such results with legumes requires corresponding provision of the essentials necessary for their successful growth. In a crop like clover, the seed crop of which

Where good crops of clover are obtainable, prosperity reigns.

alone brings over $1,250,000 to Wisconsin farmers, for example, every reasonable precaution should be taken to insure its success.

Recently a Missouri farmer aptly remarked that "If a law were passed making it compulsory for all farmers to plant at least a fifth of their acreage to legumes, there would be no surplus crop problem."

Cut Feed Bills

The disproportionate production of grains and fiber crops to the acres devoted to legumes has been brought about by a number of causes. Among them has been the increased cost of legume seed of all kinds. For instance, 20 years ago clover seed could be purchased for 10 cents a pound while now it is worth three times as much. To seed an acre thus entails an expense four times as great as is required to sow an acre of grain and 20 times more than to plant corn on the same area. This spread in planting cost is further aggravated by the great hazard the average grower faces in securing a good stand of legumes as compared to other staple crops.

Legumes require plenty of available plant food and most soils normally provide insufficient quantities for this crop unless they are treated. The cost of supplying the deficient fertilizing elements to fully nourish these crops is far less than is now being spent for feedstuffs.

Over a half million tons of mixed feeds are bought by Iowa farmers every year. Farmers of New York State spend three times as much as their Iowa brothers, while New England dairymen part with one dollar out of every three they take in for feed.

Then consider the case of Wisconsin dairymen. Each year they spend more than $30,000,000 for mixed feeds while not over a thirtieth of this amount is as yet being invested by them for commercial fertilizers. It has been estimated that if the annual investment in commercial fertilizers merely was doubled, it would be possible for these same farmers to grow enough nutritious feed to equal in value two-thirds of their present feed bill.

Today farmers everywhere who have not learned how to "baby"

(*Turn to page 55*)

The Inquiring Mind *and the* Seeing Eye

By Dr. A. S. Alexander

University of Wisconsin

Foreword

TO me, it seems of paramount importance that everything our hands find to do should be done with all our might and that enthusiasm, earnestness, thoroughness, and integrity should inspire and rule our efforts.

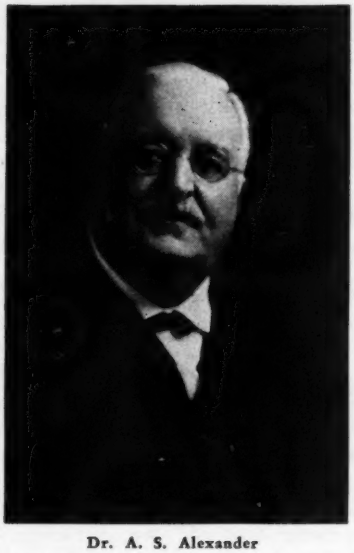
Let me tell you two little stories to indicate the different perspectives and principles which may influence the quality of work and allow you to "point the moral:"

I

An aged, white-haired Scottish stone-mason was slowly and carefully setting the great, grey granite stones in the wall of a little schoolhouse. A young man, who noticed the progress of the structure, as he passed that way daily, stopped and said to the builder:

"Say, friend! You are building awfully slow! You'll lose money on the job. Why don't you hustle and get it done in a hurry?" To which the old man replied:

"Aye! Nae doot I'm slow; but mind ye, lad, when I get through, my work will stand for a thousand years!"



Dr. A. S. Alexander

Widely known and loved for his homely portrayal of rural life, Dr. Alexander, agricultural writer and bard of Wisconsin, needs no introduction to those who hold Nature beautiful. We are happy, indeed, to secure for our readers a series of articles in his genial and sympathetic style which will appear under the title—The Inquiring Mind and the Seeing Eye. In these stories Dr. Alexander will pay kindly tribute to some of our great agricultural scientists whose praises are too little sung. In each we will find inspiration to carry-on in our absorbing interests toward the recognition which is bound to come.—The Editors.

II

A journeyman bricklayer, on a tramping tour through Kansas, ran out of funds and took on the job of building a tall, slim kitchen chimney to defray expenses, and employed a cheap laborer as helper. When the work was done the contractor said to his helper: "Here, Jake! Just hold the chimney steady while I go and collect our pay!"

NOW let me tell you, briefly, the inspiring story of a poor, working Scottish cobbler who accomplished marvelous things, by perseverance, industry, indomitable will power, and high purposes without a thought of personal gain.

Thomas Edward, the subject of this sketch, was born in

1814 and spent his life in Aberdeenshire and Banffshire, in the North of Scotland, in strenuous, successful research work, "subsidized" by nobody and entirely dependent upon his own humble resources.

Of him Samuel Smiles said in his book: "He was one of those men who lived *for* science, not *by* science. His shyness prevented him pushing himself forward. For nearly thirty years he fought the battle of scientific poverty."

Edward was a self-educated man. It has been remarked that a "high-brow" is a man who has been educated beyond his intelligence. Well, Edward wasn't a highbrow; nor was he ignorant. His triumphs in research work prove that lack of a university education does not necessarily prevent an earnest, thorough worker from gathering and contributing a wealth of facts regarding any science of which he makes a life study. It should also be plain, from Edward's experiences, that disappointments, adversities, and tribulations should not squelch the courage of any man who loves nature and her works.

Thomas Edward, Scottish Naturalist

Faced Many Obstacles

Despite his lack of higher education, equipment, means, books, and expert advisers, Edward achieved true greatness and success. In 1866 he was elected an Associate of the Linnean Society,—one of the highest honors that science could confer upon him. After that date, he was able to do comparatively little for the advancement of his favorite studies, so badly had he been battered about by falling from rocks in search of Coast birds. He had also become afflicted with rheumatism, caused by the damp and cold to which he was exposed at night, during which time he carried on most of his investigations.

As one result of his work, Edward collected 177 different specimens of British sessile-eyed crustacea on the shores of the Moray Firth and, of these, 20 were new to science. During his life time he made about 500 cases with no tools other than his shoemaker's knife, hammer, and a

saw; and he papered, painted and glazed them all himself. These cases he filled with thousands of specimens and hundreds of them he had to sell to meet expenses during his many illnesses. Just before his death he had still 60 cases, filled with about 2,000 specimens of mammals, birds, fishes, crustacea, molluscs, and insects.

Considering that Edward began to work for his daily bread when but six years old, had labored incessantly for the rest of his life, brought up his family of 11 children respectably and virtuously, educated them much better than he had been educated and dressed them comfortably, his tremendous contributions to the science of natural history were simply astounding. Toward the end of his life he could earn but eight shillings ($2.00) a week and twelve shillings a week had, probably been his maximum earnings as a cobbler when fit and well. Sales of his collections sometimes brought in extra income.

The Will to Do

Edward never lost a moment of time. He worked daily from 6 A. M. to 9 P. M. then went out to the fields, woods, cliffs, or seashore with his supper of oatmeal cakes in his hand; and after the night had passed, he returned home in time for his next days' work. He stuffed his birds, or made the cases for his specimens, by the light of the open fire.

From his own experiences Edward came to the following conclusions:

"No one who steps this earth, or even crawls upon it, need ever despair of achieving whatever good they have set their minds on. Firmness of purpose and the *will* to do and dare will accomplish almost anything. The *will* is the key that opens the door to every path, whether it be of Science or of Nature, and everyone has it in his power to choose the road for himself."

Although he had many difficulties and sicknesses Edward enjoyed "a happy life." Smiles says of him:

"He was hopeful and cheerful. He had always some object to pursue with a purpose. That constitutes one of the secrets of happiness. He had a hobby; that is another secret."

His famous shotgun was a treasure and most important item of his equipment, when collecting specimens of birds and beasts. He bought the old gun for four shillings and sixpence ($1.12) and it was so rickety that he had to tie the barrel to the stock with a piece of thick cord. He carried his powder in a horn, measured out the charges with the bowl of a tobacco pipe, and kept the shot in a brown paper bag. That gun suffered, like its owner, in one of the two experiences we shall recount to illustrate his determination and courage in the face of all obstacles.

He Got the Bird

One morning when he was returning from his night's rambles on the sea-coast under the cliffs of Tarlair, Edward shot a rare bird that flew out of a cave. It fell on the top of the cliff, so he scrambled up after it, carrying his ramshackle gun. All went well until he reached a bend half way up the cliff. There he was halted. To come down, unless headlong, was impossible, and to go up seemed equally impracticable. At length, however, he managed to clutch a little projection of rock protruding far above him, then he clambered a little way up, secured a firmer footing, and at last reached the summit in safety. There, he looked about for the bird and saw it on the edge of the cliff, apparently dead. On stooping to pick it up, it fluttered, raised one of its wings, and went over the precipice. Edward grasped at it, failed, lost his footing on the smooth rock, and fell 40 feet to the sea-beach below. His gun fell out of his hand and lodged between two rocks on the beach. Edward fell upon the gun, and smashed it to pieces; but it broke the force of the fall and probably saved his life.

After lying unconscious for a time,

Edward came to, felt himself wedged tight between two rocks, and was quite unable to set himself free. Two farm hands had seen him fall and now looked down upon him. One of them called:

"Ye're no dead yet, are ye?" but Edward was unable to answer. Later, the men managed to free him and take him home. A month elapsed before he could return to the rocks and salvage the remains of his gun.

But he got the bird he was after!

Encountered a Polecat

On another occasion Edward had a terrible encounter with a polecat or fumart which is of the weasel family, but much longer, bigger, and stronger and quite as odoriferous as our own skunk, whose motto is: "don't hurry; others will!"

The fumart is an extremely destructive brute, especially in the poultry-yard, where it kills far more than it eats. Its principal luxury is to drink the blood and suck the brains of the animals it kills.

One night when it rained, Edward was sleeping in a vault, level with the ground, in the ruined, haunted castle of the Boyne, about five miles west of Banff. Suddenly, he was awakened by something pat-patting against his legs. It was so dark he could not see the animal. He moved, but the beast did not go away; then he raised himself up, and it scampered off. Again he tried to sleep, but felt the same pat-patting. This time it was higher up on his body, and he thrust the intruder off. It shrieked as it fell to the ground, telling Edward it was a polecat. There was the body of a water-hen in his breast pocket and that, he had no doubt, was attracting the polecat; so he buttoned up his coat to protect the bird and prepared for the return of the foe.

He had not long to wait. A glimmer of light now entered the cave, and as he watched the entrance, he dimly saw the beast approach. In a moment it was crawling upward toward the bird. When it raised its head, Edward gripped its throat and sprang to his feet. The beast screamed and yelled. Edward hung on. The vault echoed with howlings and an awful suffocating stench filled the air. Still Edward gripped and squeezed with might and main,

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Above: The Cliffs of Tarlair, where Thomas Edward fell.

Right: Boyne Castle, where Thomas Edward fought a polecat.

¶ *More intelligent cultural practices and use of fertilizers will produce—*

BETTER SWEETS

By A. B. Bryan

Clemson Agricultural College, Clemson College, South Carolina

LARGER yields and a larger per cent of good quality marketable sweet potatoes were the result of larger amounts of fertilizers with high per cent of potash, in a sweet potato contest conducted among South Carolina farmers by the State Extension Service in 1929. Other factors having effect on the yield and quality were the quality of seed and plants, the time of planting, and the spacing or distance between rows and plants.

With about 50,000 acres planted annually to sweet potatoes, the crop is fifth in importance among South Carolina crops, and yet the carload shipments of marketable potatoes—262 carloads in 1928—have been much less than in other States which have much smaller acreages. For example, New Jersey, Maryland, and Delaware, with only one-sixth to one-third of South Carolina's sweet potato acerage, send five to eight times as many sweet spuds to market.

The chief explanation of the small movement of sweet potatoes from South Carolina is that the average farmer has seemed unable to grow a large enough yield and high enough percentage of No. 1 potatoes to make it a profitable cash crop, this, despite the fact that the crop is naturally adaptable to South Carolina soils and climate. These facts and conditions are true also of some other Southern States where sweet potatoes could be and should be an important supplementary cash crop. Georgia with over 100,000 acres ships only 600-700 carloads.

The feeling that it would be possible by improved practices to increase the yields for even competiton with other producing areas prompted the State-wide sweet potato contest which was initiated in the spring of 1929, and made possible by the cooperation of the South Carolina Sweet Potato Growers Association, which donated $600 for a State prize of $150 and first and second prizes of $100 and $50 in three districts, Upper, Middle, and Lower.

Contest Popular

About 300 sweet potato growers entered the contest and 180 turned in complete records, showing some very interesting results as follows:

Highest total yield	672 bushels per acre
Highest yield of No. 1's	378 bushels per acre
Average yield of No. 1's	176 bushels per acre
Average cost of production	$58 per acre
Average net profit	$125 per acre

The winner of the State prize, G. A. McCutcheon, a recent graduate of Clemson College, produced 468 bushels, of which 378 bushels were

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A difference in yield of 40 bushels resulted from the use of 300 pounds additional of an 8-4-6 (PNK) fertilizer.

Potatoes Pay in Oklahoma

By D. C. Mooring

Extension Horticulturist, Oklahoma Agricultural and Mechanical College

THE financial potato disaster of 1928 had a marked effect upon the growing of Irish potatoes in the State of Oklahoma during 1929. The commercial acreage harvested last year was very little over half that of 1928. Again, the acre yield of 1929 was not as great as that of 1928; however, prices were better. While it cannot be said that the potato growers were entirely satisfied, they felt much better at the close of the 1929 potato season than they did at the close of the 1928 season.

The essentials of successful Irish potato production are being recognized and heeded. Among the essentials which might be mentioned are: fall plowing, the use of legumes, good seed, intelligent use of commercial fertilizer, increased amount of seed planted per acre, better cultural methods, better harvesting and grading and cooperative car shipping. Oklahoma's acre yield in the commercial districts has been increasing.

Legumes

The legume most universally used by the potato growers, especially in following the spring crop potatoes, is the cowpea. The growers appreciate the value of a legume within itself, and as the use of commercial fertilizer is becoming more common, they also realize that there is greater net income where commercial fertilizers are applied to potatoes which have been preceded by a leguminous crop.

The marked effect of the value of

legumes is illustrated in the following demonstration:

Demonstration No. I—E. M. Durland, Hugo, Choctaw county, in 1928 planted Triumph Irish potatoes on ground that had previously grown cotton. He used 600 pounds of a 4-8-6 fertilizer and produced 165 bushels of potatoes per acre. The potatoes were followed by cowpeas, which were turned under that fall. In 1929 he planted the same variety of potatoes, used the same amount of fertilizer, namely 600 pounds of a 4-8-6, and the yield was 232 bushels per acre. As mentioned above, the average State yield for 1928 was greater than for 1929, so it is noted that the use of legumes was a big factor in the increased yield. Following the 1929 spring crop of potatoes, Mr. Durland planted soybeans and turned them under in the fall, at which time they were waist-high. He planned to plant potatoes on this same piece of ground in 1930.

In the larger potato sections of the State, the growing of legumes following the spring crop is becoming more common. On a trip through the Fort Gibson valley and Chooska bottom, a number of instances were noted where cowpeas were being turned under on ground which was planted to Irish potatoes in the spring.

Seed Source

The commercial growers realize the value of good seed and there is an increased use of certified Irish potato seed. The planting of certified seed is becoming more common in case of the home patch also. In some demonstrations the increased yield from the use of certified over common store run seed has been very marked, as illustrated by the following demonstrations:

Demonstration No. I—C. W. Puckett, Wayne, McClain County.

Variety	*Seed Source*	*Yield per A.*
Triumph	Certified	160 bu.
Triumph	Store run	40 "

Demonstration No. II—E. E. Shephard, Okemah, Okfuskee, County.

Variety	*Seed Source*	*Yield per A.*
Triumph	Certified	246 bu.
Triumph	Store run	116 "

About six years ago the average amount of seed planted per acre was 8 bushels, now 12 to 14 bushels are very common.

Commercial Fertilizer

The use of commercial fertilizer with the commercial growers is becoming an almost universal practice. The two main problems for each to settle are kind of fertilizer and the amount to use. Perhaps the most uniformly used is that analyzing 8 per cent phosphoric acid, 4 per cent nitrogen, and 4 to 6 per cent potash. The amount used per acre varies, however, 500 pounds coming nearer the general average at the present time.

Demonstration No. I—Chas. Dennison, Idabel, McCurtain County.

Triumph variety of Irish potatoes

Amount of fertilizer per acre	*Analysis of fertilizer*	*Bushel yield per acre*
500 pounds	4-8-6	123
Check		104

19-bushel increase per acre at $1.30 per bushel equals $24.70.

Cost of fertilizer and distributing same $10.00.

Net increase $14.70.

Results of the following demonstrations show the differences in yield where variable amounts of fertilizer were used.

Demonstration No. II—F. I. Edwards, Henryetta, Okmulgee County.

Triumph variety of Irish potatoes

Amount of fertilizer per acre	*Analysis of fertilizer*	*Bushel yield per acre*
None	.....	70
400 pounds	4-8-6	175
800 pounds	4-8-6	250

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Crotalaria has proven an excellent crop to grow between rows of young trees in Florida citrus groves.

CROTALARIA

By J. Francis Cooper

Editor, Florida Agricultural Experiment Station

NEW life for old soils of the Southeast is being provided in abundance by a new and promising leguminous crop, Crotalaria. This crop, native to Africa, India, South America, Mexico, and the United States, has been brought into prominence in recent years by the United States Department of Agriculture and the Florida Experiment Station. It has spread like wildfire in Florida, and now is reaching out into other southeastern States. Apparently, it bids fair to be worth much as a rejuvenator of poor, worn-out soils.

It has taken Crotalaria 20 years to come into its own, but it is coming now with a bang—and yet it is a comparatively new crop.

Different species of Crotalaria have been under observation at the Florida Experiment Station ever since the late Dr. C. V. Piper, at that time head of the Forage Crops Office of the United States Department of Agriculture, sent some seed there for testing in 1909. Except for the fact that a few seed were planted each year and the plants kept growing, very little attention was paid to the crop until W. E. Stokes was appointed to investigate forage crops at the Florida Station, in the fall of 1921.

Seeing the plant and realizing its possibilities, this young agronomist set about testing it on a more elaborate

Crotalaria growing in a tung-oil grove.

Until recently growers were handicapped in planting this new crop on account of lack of seed However, a large fruit company has started growing Crotalaria in its pineapple fields and grapefruit groves of Porto Rico. With the cheap labor which prevails there, the company can harvest Crotalaria seed and sell it in the United States at prices which make the growing of this crop possible on a large scale. This company alone sold 105 tons of the seed in Florida this spring, and could have sold many more tons if it had had them.

scale. Having thoroughly tested it in practically every part of Florida, Mr. Stokes sent some seed for trials in other States, notably South Carolina, Tennessee, Alabama, and Mississippi. The crop has shown up well in limited tests in all of these States and now is being tested in North Carolina, Texas, Louisiana, and some other Southern States. Investigators of the Department of Agriculture's Forage Crops Office report that the plant has made good growth as far north as Ohio and Illinois, but has not produced seed.

Large Spring Planting

Florida farmers and grove and orchard owners like it so well that they have planted every available seed this spring and have endeavored to obtain more. Something like 125 tons of seed have been sold in the State. Planted at the usual rate of 10 pounds to the acre, this would be sufficient for 25,000 acres of grove, orchard, and crop land. It is estimated that in 1931 the plantings will be increased by 50 per cent in Florida alone. If letters and inquiries about it are a fair indication, the acreage in Crotalaria in other Southern States will be rapidly increased as fast as seed can be obtained.

The words "cover crops" don't mean a great deal to the Northern farmer, whose lands are frozen and snowed under for weeks during the winter. His land retains its fertility, and crop production year after year is not so difficult. However, in the South, which boasts of its balmy climate and its winter sunshine, maintaining soil fertility and crop production is something else again.

Twenty years ago practically every Southern farmer cleared for himself one or more "new ground" fields each winter. This virgin soil, which had been blanketed by forest trees, was fertile and would produce good crops for a few years. Ten years ago the practice was on the wane, and now it is almost extinct. Most of the tillable lands and many not so easily tilled have been cleared. Forest trees are not as plentiful as formerly, and the marginal as well as non-farming lands are being left in timber. Farmers realize that they must cultivate year after year their best lands.

With mild winters, which permit the soil organisms to work unhampered practically all the year in tear-

ing down organic matter and making it available as plant food, principally nitrates, and with considerable rainfall during the winter to leach these nitrates out of the soil, it is little wonder that the Southern farmer found himself with lands which had lost a good part of their fertility after having been cultivated for a few years.

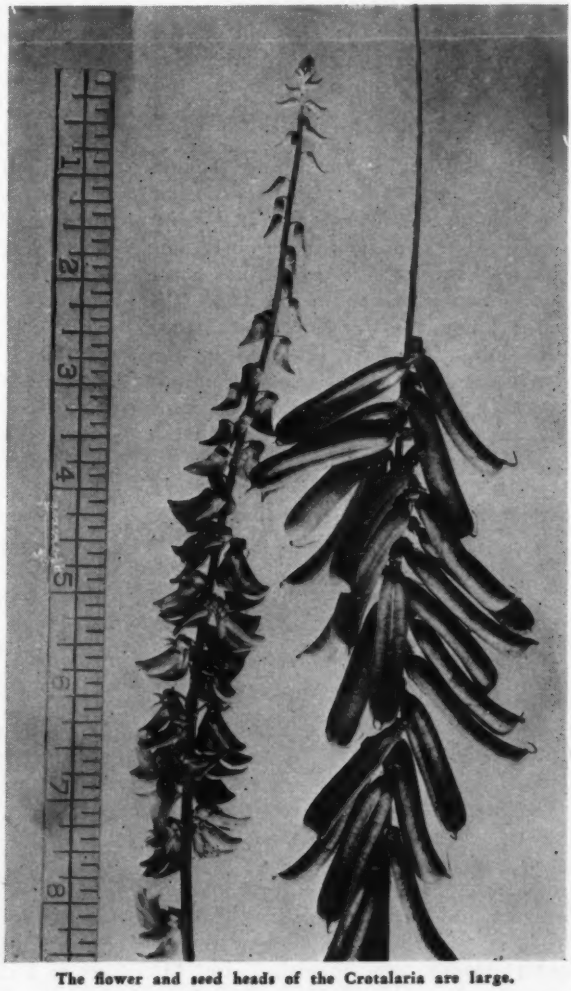
To Maintain Fertility

What to do to stop this flow of fertility from the soil was a question that agitated agricultural investigators and farmers for some years. However, out of it came the practice of growing soil-improving crops, notably the legumes, whose roots harbor the millions of tiny bacteria which have the power of taking nitrogen from the air and fixing it for use by plants which grow in the soil. These bacteria are the original manufacturers of nitrates from the nitrogen in the air.

Both summer and winter legumes in wide variety have been tried as cover and soil building crops in the Southern States. Many of them have proven good. Among the array of summer legumes which have found a place in Southern agriculture are cowpeas, velvet beans, soybeans, and beggarweed. One of these, velvet beans, was introduced into the Southeast by the Florida Experiment Station, in cooperation with the United States Department of Agriculture.

Desiring to obtain some accurate information about the place of leguminous and other cover crops in the soil building and crop production scheme, I sought out Dr. R. M. Barnette, brilliant young soils chemist on the staff of the Florida Experiment Station.

"The live or rotting portions in the soil are necessary for the successful production of any crop under field conditions," he told me. "They are needed not only to furnish nitrogen but also to maintain in the soil a balanced condition of the nutrients necessary to plant growth. Among these nutrients are not only nitrogen, potas-



The flower and seed heads of the Crotalaria are large.

sium, and phosphoric acid, which are needed in large amounts and commonly applied in fertilizer, but also the rarer elements, of which only traces are required by the plants.

"This decaying organic material is the stomach of the soil. It digests the mineral as well as the organic portion of the soil, making available to the numerous plant rootlets in the soil the nutrients essential to plant production, and renewing these nutrients when they are removed by plants or other means. This matter of readjustment and renewing of nutrients is extremely important in sandy soils which are subject to leaching.

"Besides being the stomach of the soil, the decaying organic matter aids in fixing plant nutrients in the soil and keeping them from being washed out.

"In addition to furnishing organic matter, cover cropping has another very important advantage. In a rainy season, large quantities of materials are leached from the soil unless there are growing plants on the land. A large amount of green growth stops this loss. We have observed in our lysimeter tests that growing crops actually keep from 40 to 50 per cent of the water from going through the soil in a rainy season.

"This function could just as well be performed by non-leguminous crops if the land is fertile enough to produce a luxuriant growth. But Crotalaria has the ability to make a heavy growth on poor soil, and thus is more desirable."

Two Popular Varieties

Thus the need exists for organic material in quantity. Crotalaria has the ability to supply this need. Of the many varieties tried, two have given most promise as cover crops in Florida and are being tested in other Southern States. These are Crotalaria striata and Crotalaria spectabilis.

The following descriptions of the two species are furnished by Mr. Stokes, the man who is largely responsible for the widespread interest in the crop. "Striata, the species now most widely used, is an erect growing annual, which reaches a height of six feet or more under average conditions. The stems are woody, especially as the plant advances in age. The flowers are yellow and borne in long terminal racemes, but are not as showy as are the flowers of several other Crotalarias, some of which are used as ornamentals. The seeds are small and olive green to mottled brown in color. The leaves are trifoliate, the three leaflets averaging 2 inches in length and 1½ inches in width. The root system is fibrous and extends to a great depth in sandy soils. Striata is very indeterminate in its seeding habits. Flowers, immature pods, and mature pods may be found on the same plant during entire season after seeding has started. It produces a heavy growth.

"Spectabilis also is an erect annual which attains a height of six feet under average conditions. The stems are not as woody, the yellow flowers are more showy, and both seeds and seedpods are larger than are those of striata. It has a tendency to mature more seeds at once, thus facilitating machine harvesting of seed. The leaves of this species are not divided into leaflets.

"Both species reseed well, if allowed to grow until seed are produced. Owing to the fact that a considerable number of hard-coated seeds are found in any lot of seed, often a satisfactory stand will be secured the second year after seeding, although no plants have been allowed to produce seed the first year.

"From four to five months after planting are required for the production of mature seed. It seems to be this factor which limits the northern use of the crop. By obtaining a fresh supply of seed every year, it is possible that farmers in States north of Tennessee and North Carolina could grow Crotalaria and obtain its benefits as a cover crop. It may be that strains which mature seed more

quickly will be developed, as was done with velvet beans, making this crop accessible to more States."

Crotalaria seed is sown either broadcast or in rows, the former being the method most widely used. Inoculation is not necessary. It has been found by Lewis T. Leonard, legume bacteriologist of the United States Department of Agriculture, that the bacteria forming nodules on the roots of Crotalaria are the same as those in the nodules on cowpea roots. Also there is growing wild in Florida a dwarfed native species of Crotalaria, so that the inoculating organisms are widely scattered.

Why Crotalaria?

Why is it necessary or desirable to grow Crotalaria? Why can't the farmers use cowpeas, velvet beans, soybeans, and beggarweed, which have been established for years? Perfectly logical questions, these.

The answer is that certainly these other leguminous crops should continue in use. But Crotalaria is desirable for the reasons that it will produce more growth and result in greater amounts of organic matter and nitrogen to turn back to the soil, and that it will produce luxuriant growth on quite poor, sandy soils where many of these other crops will not grow at all, or will make very poor growth.

Mr. Stokes has found that Crotalaria will yield as high as 18 to 20 tons of green material to the acre, although average yields range from 5 to 15 tons. Over a five-year period on the Experiment Station farm it yielded three times as much as velvet beans, three times as much as cowpeas, four and one-half times as much as Mexican clover (also known as Florida pursley), and over seven times as much as beggarweed.

In addition to higher yields, it carries a higher percentage of nitrogen. With the five-year average yields and the average per cent of nitrogen in each plant as bases, Mr. Stokes figures that the amount of nitrogen in each annual crop ranges about like this: Crotalaria, 118.4 pounds; velvet beans, 34.6; cowpeas, 29.6; Mexican clover, 13.7; and beggarweed, 8.8 pounds.

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A close-up view shows the rank growth of Crotalaria.

Staked Tomatoes

By E. R. Lancashire

Extension Specialist, Ohio State University

BETTER tomatoes can be grown on stakes than can be produced on the ground. Every gardener can have a dozen or two tomato plants growing on stakes with very little trouble. In the commercial producing sections it is customary to see thousands of plants growing in this way.

Since the commercial growers find it profitable to tie tomato plants to stakes, it is more than likely that the same system would be practical in the home or farm garden. Earliness is the big reason behind the job of staking tomatoes. From 10 to 14 days may be cut from the time required to grow tomatoes on the ground. Another factor of considerable importance is that the staked tomato plants produce more ripe fruits in the early part of the season than do those grown on the ground. While the tomatoes sell for more per pound is a good time to have them for home use or for sale on the roadside stand.

Cleaner Fruit

Staked tomatoes do not yield as many pounds of fruit per plant as do those grown without stakes, but there are more plants per square foot of garden space. The usual distance for staked tomatoes is 14 to 16 inches between plants in the row and four feet between rows. This is from 4 2/3 to 5 1/3 square feet per plant. The usual spacing for ground tomatoes is four feet each way or 16 square feet per plant.

Fruits grown on staked plants are always cleaner and usually less subject to rotting than are fruits growing in direct contact with the soil. Then, too, the labor involved in tying and suckering the staked plants is offset by the ease with which the fruits are picked from the staked plants.

Farm and home gardening is an intensive operation. Growing tomatoes on the ground is extensive in principal. A garden looks much neater with tomato plants trained to stakes five or six feet high. That which adds pleasure to the gardener's work is best not overlooked. Pleasure is to be derived from growing tomatoes on stakes.

The necessary knowledge of how to go about growing tomatoes on stakes is easily acquired. First, the gardener obtains or grows tomato plants in such a way that when the time arrives to set them in the garden they will be from 10 to 12 inches high. These plants should be husky in appearance. Short, blocky plants are the kind that give best results. The first blossom buds should be well formed but not opened when the plants are set in the field. Experience shows that plants with open blossoms or with small tomatoes on them often drop them because of the shock caused by the transplanting operation. There is little to be gained by setting plants out with open blossoms and perhaps a fruit or two already well formed only to have such an apparently good beginning disappear.

Plants to Plant

Such plants as the one described as most likely to give the best results can be grown at home or purchased from a plant grower. The secret of growing such plants lies in giving them plenty of room in the plant beds. The seed is sown from 8 to 10 weeks before the time to set tomatoes in the field.

As soon as the plants are two to three inches high they are removed to

a coldframe and here spaced six inches apart each way. Ten days before the time to take them to the field, it is well to take a large knife and cut between the rows of plants in the coldframe. Such cuts are made four or five inches deep. Three days later a second cut is made; this cut is at right angles to the first one. This job is called "blocking the plants." It is done to separate the tomato roots so that the "blocked" plants can be lifted out readily when they are removed to the field.

Better tomatoes can be grown on plants staked like this.

In the week or more allowed between the first cutting and the transplanting operation, the severed roots have time to heal. Hundreds of new fibrous roots are forced out by the root system because of this cutting of the plant's root system. These new roots bind the soil together and make it possible to move the plants with very little disturbance to the root system. Blocked plants rarely wilt when the job is correctly done.

Plenty of ventilation is needed at all times in growing good tomato plants. Plants need to be kept fairly well watered, too, so that there will be no serious checking to the growth of the plant. A growing plant can be kept from becoming too tall by exposure to low temperatures. All the ventilation possible should be given without exposing the plants to danger of freezing. Between 55 and 60 degrees is a suitable temperature for tomato plants.

A plant which has been grown too dry is likely to be woody near the ground line. When such a plant is set in the field this woody part of the stem cannot enlarge rapidly and so the plant has to form a new root system above this point. In doing this the maturity of the first saleable fruit is delayed.

The second step consists of transplanting these tomatoes to the field. The "blocked" plant is lifted with as much of the root system intact as possible and is set in an open furrow. The depth of the plant can be an inch or so lower than it was in the coldframe. The soil should be firmed about the "blocked" plant's root system so as to establish immediate contact between the soil of the field and that on

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LED by a BOY

By G. O. Mullan

Teacher of Vocational Agriculture, Martinsburg, West Virginia

IN the gateway of one of America's most beautiful and famous valleys, the Shenandoah, is located Berkeley county of West Virginia. The county is in the eastern Panhandle of the State, extending as a crooked finger between Maryland and Virginia and is famous for its apple products.

In Berkeley county, West Virginia, an apple country, is a boy, Oscar Dick, who, a year ago, produced 667 bushels of potatoes on 1½ acres. This is the more remarkable because of the fact that the average potato production in Berkeley county is approximately 110 bushels per acre and the fact that the boy never grew potatoes before, his father being manager of one of the largest apple orchards in that section.

Oscar was a student in the class of vocational agriculture at the Martinsburg High School and selected potatoes as his project. In the class all details of potato growing were gone into and thoroughly studied and then carried out as far as possible.

The boy selected an old alfalfa stand and plowed it as early as possible to permit soil breaking up by freezing. He then decided to grow Irish Cobblers and purchased certified seed. He purchased enough seed to plant at rate of 15 bushels per acre. Then came the fertilizer and he decided to use 2,000 pounds of 2-7-10 per acre.

As soon as the ground could be worked, it was disced thoroughly and half the fertilizer was drilled broadcast. The ground was then laid out and the potatoes were planted 3 inches deep and 12 inches apart, one piece to the hill. The other half of the fertilizer was drilled in the row with the potatoes. Ten days after planting, a spike-tooth harrow was used on the field to kill young weed growth. When the potatoes were about six inches high, they were sprayed with Bordeaux arsenate and then top-dressed with 100 pounds of nitrate of soda per acre.

A few days later the potatoes were cultivated to preserve a mulch and kill weeds. This system of cultivation was very shallow and did not disturb the network of roots the vines were making between rows. It was followed by the same type of cultivation all through the crop life until bloom when all cultivation ceased. Oscar continued to spray his potatoes with Bordeaux arsenate until the vines were entirely dead.

His crop of 667 bushels, all of which could have been certified, were very even in size and smooth and of exceptional quality. The large yield astonished local farmers, as it beat the county record by many bushels. The boy and his father attribute his exceptional success to the fertilizer and spraying.

Following is a summary of his cost of production:

Labor, man—443 hours	$112.42
Horse—67 hours	8.35
Tractor—5 hours	2.50
Gas, Spray Materials, Delivery, Depreciation on machines	15.05
Potatoes	32.00
Fertilizer	45.43
	$215.75

Produced 667 bushels for $215.75, or a cost of 32 1-3 cents per bushel.

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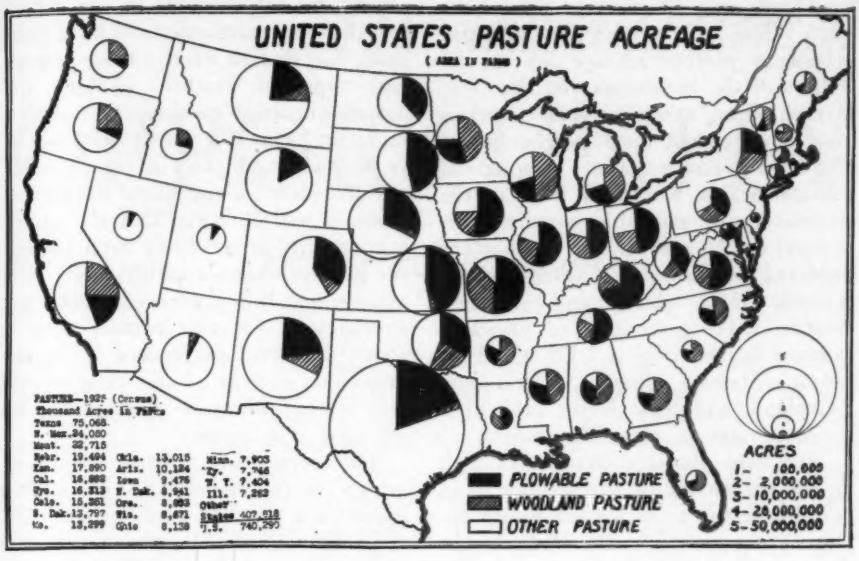


Pastures

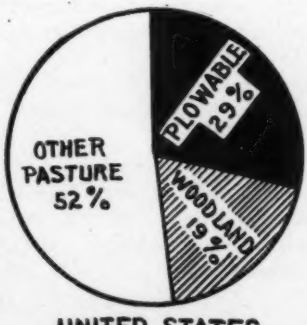
¶ *Eighteenth in this series*

By Walter H. Ebling

Agricultural Statistician, Wisconsin

OPPORTUNITY for progress in the management of our pasture resources is probably greater than in most other phases of our agriculture. The subject of pastures is one of the broadest in the entire field, and the amount of attention it has received up to now has probably been much less than the subject will have in the future.

The widespread importance of pastures can probably be appreciated when we realize that out of an entire land area of about 1,903 million acres in the United States, 1,055 million, or about 55 per cent of the total, are in some form of pasture. To be sure, much of this pasture is on poor land and relatively unproductive. There are about 257 million acres in other forage crops, of about one-fourth as much as the pasture area. Yet, the total productivity of animal sustenance of this smaller area in harvested feed crops is probably greater than that of the huge pasture acreage even though it is four times as large.



UNITED STATES FARM PASTURE LAND

According to the last census, 29 per cent of the pasture acreage in the United States is plowable, 19 per cent

woodland, and 52 per cent other pasture. The bulk of the plowable and woodland pasture acreage lies in the valleys of the Mississippi and the Ohio Rivers. The "other pasture," which is to a large extent open ranges, lies in the dried Western States. Among the Central States, Kentucky leads in the percentage of plowable pasture with a total of 71 per cent of its pasture reported as plowable. Illinois ranks second, Iowa third, and Missouri fourth in the percentage of plowable pasture in this region. Of the East Coast States, Virginia, Delaware, Maryland, and New Jersey rank high in percentage of plowable pasture.

The New England States run high in the percentage of pasture that is in woodland, the total for the group being 54 per cent. In the Midwest the States with the largest portion of their pasture in woodland are those at the head of the Great Lakes: Wisconsin with 51 per cent, Minnesota with 45 per cent, and Michigan with 43 per cent. Pasture acreage which is classified as neither plowable or woodland, and is listed as "other pasture," refers largely to the open range of the West. In acreage, Texas, because of its great size, is the leader, and most western States rank high in the portion of their total pasture area in this class. In Arizona, Nevada, and Utah, more than 90 per cent of the pasture reported is in the "other pasture" classification.

Can Be Classified

In the United States the pasture regions can be roughly classified as the Northern humid grasslands, the Southern humid region, the Western range, and the Pacific humid region. More than half of the entire pasture area is in the form of the more arid Western range and more than one-fourth of it is in the form of woodland pasture, both of these forms having a relatively low livestock carrying capacity.

Since there is such a vast difference in the number of animal units being carried by the pastures in the different areas, separate estimates have been made for certain of the more important types of pasture. Taking the humid grassland pastures as a whole, much of which is improved land in farms and would fall in the plowable pasture class in the more humid regions, it will be noted that the carrying capacity is relatively high though the pasture season is rather short. The average number of acres of pasture per animal unit for this pasture class is about 4.8 acres per season. The approximate acreage of this type of pasture is 231 million of which about 64 per cent is in farms.

The semi-arid grazing lands of which there are about 587 million acres have a lower carrying capacity per acre. About 24 acres of this land are used per animal unit per season, but the pasture season is considerably longer than on the humid grasslands and most of the semi-arid and arid grazing lands are in the West. Only about one-fourth of this type of pasture is in farms.

Forest and cut-over pasture also have a rather low carrying capacity. Most of this type of pasture land is found in the eastern half of the United States and the Pacific Coast States. For a growing season averaging less than six months in length, about 23 acres of this land carry one animal unit. About 237 million acres fall into this group, and about 28 per cent of it is in farms. The animal unit employed by the United States Department of Agriculture in these estimates represents the estimated feed consumption of one adult cow, horse or mule, 5 hogs, 7 sheep or goats, or 100 poultry per year.

Pastures as a rule have not been valued very highly in our agricultural enterprise. Because of their abundance on the American frontier, relatively little attention has been given to them. Pastures were more or less taken for granted, and studies or experimentation with them have had

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He saw and seized
OPPORTUNITY

By E. R. Jackman

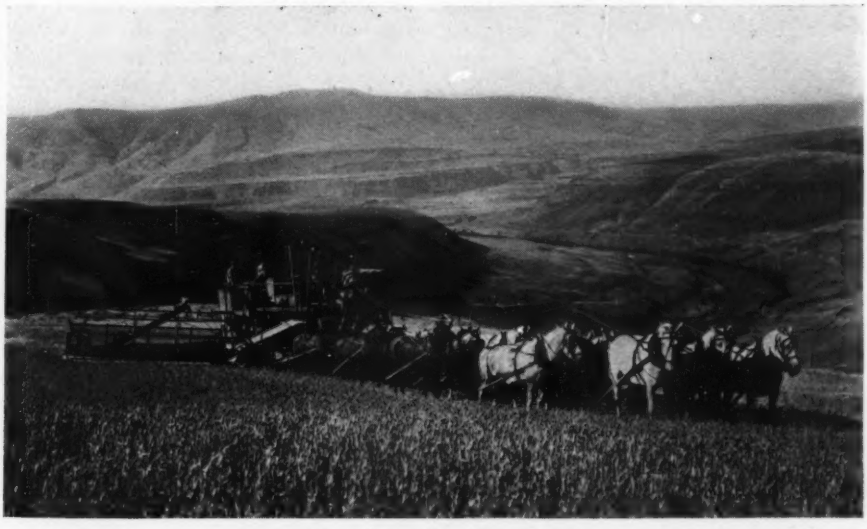
Extension Specialist in Crops, Oregon State Agricultural College

ONE of the leading sheep men of the West, a man who has built a real fortune from nothing, says that the only difference between men who make money and those who don't is that the successful men see opportunities and grab them and the others see opportunities and say to themselves, "Now there's a chance to make some money. I'll look into that some day." And then the idea languishes and dies.

Howard Wagner of Corvallis, Oregon, is an example of a farmer who saw an opportunity in specialized farming and unhesitatingly seized it. Most farmers talk of their output in terms of bushels. He talks of his only in tons. An idea of his business may be gained by his products last year. In round numbers he sold 250 tons of Austrian winter peas, 150 tons of seed oats, 100 tons of rye grass seed, 50 tons of various kinds of vetch seed, and 3 or 4 cars of clover seed. This runs into "important money," well over $100,000. All of these products are seeds and the business has been built up in six years.

Mr. Wagner says, "I used to grow wheat and oats and just about went broke. The land around here got so it would only yield 12 to 20 bushels an acre and taxes and labor kept going up but the price stayed the same as before the war. It got to the point where I had to do something.

"I thought I saw an opportunity in



Mr. Wagner now uses tractors. He still has seven horses, but does not use them very much.

seeds. At first I sold to some of the western firms here but I made up my mind I might just as well really get into the business and have enough stuff to sell to interest the eastern companies. I couldn't see any reason why I couldn't sell to these eastern folks direct if I had enough and could put it out right. So I began to experiment with seed cleaning machines and investigated the quality of seed being wholesaled by seed companies of the West. I found that by spending some money and using what brains I have I could clean any kind of seed as well as any of them.

Quality Builds Business

"So with good quality stuff to sell I began to expand my business. One of my main supporters was Harry Schoth, forage crops man at the Oregon Experiment Station. He told me what to grow and to some extent where the market was. It took me a couple of years to get my nose in with the larger eastern dealers, but as soon as I sold one firm and they found they could depend on me for quality, the rest was easy.

"I have pretty well learned now which firms to do business with—which ones will live up to their contracts with me. One year I had a lot of vetch seed contracted for. The price went down and I made a shipment east to one company which they rejected on a technicality. Other firms of better standing took theirs and took the loss without a whimper. I have refused to sell to that firm since and it has been some satisfaction to me to be in a position to tell them to "jump in the lake." They wanted very badly to buy some winter peas from me and I reminded them of the vetch incident and told them I didn't care to deal with them.

"Nearly everything I grow is on a contract basis. I am in business now to such an extent that I cannot take a chance. If I know I can grow a certain seed crop and make money on it at five cents a pound, I contract at that price and then it is up to me to get out and get in a big enough acreage so that the profit will amount to something.

"If 10 acres of vetch seed is a money-making proposition, I don't see any sense in stopping at 10 acres —I get out just as much as I can possibly handle. There is a lot of land around here which can be rented and I sub-contract quite a lot with neighbors. I have the cleaning machinery and have built up a reputation for my stuff and can sell more than I can produce myself, so it is a good proposition all around to re-contract with some of the neighbors. It gives them some of the benefits of my business and me more volume.

"The United States Department of Agriculture sends out frequent price information and I keep informed on the market this way. In some seasons I get daily telegraphic market reports.

"Right now the Austrian winter field pea is the big end of my business. There is a heavy demand for the seed down South and I contracted for 3,800 acres in 1930. They bring in about $40 an acre on land which would be lucky to produce $20 worth of wheat.

"I had to pioneer more or less. With these peas, for example, they were a new crop here and I had to work out the best way to handle them. I now cut them with a tractor and eight-foot mower with a wind-rower attachment. I let them lie two or three days, then go in with a combine with a pick-up attachment and take them out of the windrow. It developed at once that they have weevils, so I built a fumigating house and rush them from the combine to the fumigating room. I control the weevils 100 per cent in this way.

"Nearly all of my farming is done with tractors. We have three months to get a crop in and only three weeks to get it off, so speed in harvesting is the important thing. I still keep seven horses, but don't use them much any more."

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Pictorial

One Pair of Twins Greets Another

Above: The farmer doesn't need to worry about reducing exercises. No one really knows the number of miles he walks in the planting, cultivation, and harvesting of his crops.

Left: At the end of a long furrow a wise man "spells" himself and his horses. And no farmer thus seen can be accounted lazy.

Right: May finds city park benches crowded with "gentlemen of leisure," glad of a chance to rest their tired feet, until the next policeman orders them to "move on."

Below: Chicago's new skyscrapers stand guard along the river. Among these are the Medinah Athletic Club, the Chicago Tribune Tower, and the Wrigley Building.

Ploughing corn on the Purdue University Farm in West Lafayette, Indiana. Two-row cultivators and Percheron horses are being used here.

A quiet stream in northern Indiana. There are depths and shallows here, and alternating shade and sunshine, to attract fish and fishermen.

A young milkman's rapid delivery system. Engine-trouble and traffic jams don't bother him. But a meeting with a strange cat might cause trouble.

A swarm of bees being returned to their hive. Evidently the man at the right is not as timid as his friend, or perhaps he is immune to bee-stings.

(Left) Pop Goes the Warble: Removing grubs of the ox warble from the back of a cow. This insect causes loss in several ways, including effects on growth, gain, milk yield, and the quality of the hide. Nearly 20 per cent of all cattle hides handled are classed as "grubby." The Department of Agriculture has detailed information on this insect and the possibilities of its control.

(Below) Mrs. Ruth Hanna McCormick, the first woman to be nominated as a candidate for the United States Senate, proudly displays one of her prize Holstein cows, "Aggie Wauconda." In addition to her extensive political work, for which she is widely known, Mrs. McCormick has for years been interested in farming and its details. Her cows are usually prize-winners.

The Editors Talk

Alkali Soils

Alkali soils appear in almost every country of the world. The extensive acreage of these soils, which under natural conditions are practically worthless, and the fact they have a high potential value if properly handled make their reclamation and utilization a problem of great economic importance.

Considerable work has been done by soil scientists in an effort to overcome soil alkali and to bring these soils into production. Various phases of this problem have been studied in different countries of the world, but unfortunately the results of these studies are not available in any one language.

The progress of soil science during recent years has been phenomenal. This progress is probably the result of the changed attitude of the scientists themselves. For many years satisfied with the products of their own research which were carefully guarded, they have acquired the true research spirit and now vigorously comb the scientific literature of the world for facts to aid them in their work.

Probably the greatest factor in breaking down the conservatism of the old line soil workers has been The International Society of Soil Science. This organization in recent years has held world congresses at which almost every agricultural country of the world was represented. The society from the first has set itself to the task of bringing together all available literature on soil research and by the preparation of bibliographies to give research workers access to valuable sources of information. This exchange of ideas on soil research has resulted more than anything else in making Soil Science a World Science.

The Alkali Subcommission of the International Society of Soil Science which met in Washington, D. C., June, 1927, emphasizes in its report of that meeting, the need for assembling world literature dealing with alkali and salty soils. The papers presented on alkali soils were too numerous and lengthy to be reported in full. Abstracts from these papers and a fairly complete bibliography of world literature were prepared by Prof. A. A. J. de Sigmond of Budapest, Hungary, and his associates. Prof. Sigmond, a leading authority on soils and president of the Second Commission and Alkali Subcommission of the International Society of Soil Science, reviewed at considerable length, in his report, the papers on Genetics of Alkali Soils.

Alkali soils from the reclamation and utilization viewpoint were ably reviewed by Prof. A. Arany of Debrecen, Hungary. Of particular interest are his suggestions that further research on the chemical, physical, and biological aspects of alkali soils be undertaken. He emphasizes also the need for more specific studies on reclamation by water treatment, use of chemicals for treatment of alkali soils, influence of surface evaporation, and cultivation of alkali resistant crops.

As land utilization becomes more and more a definite subject in the program of scientific and practical agriculture, these contributions on the possible methods of handling alkali soils assume an added significance and importance.

Price of Potash

The price of any fertilizer material is a very important matter to farmers. They pay out millions of dollars a year on this account. They are entitled to know the facts regarding fertilizers and are entitled to buy their supplies as cheaply as possible.

The index number of prices are currently published. The index number of fertilizer materials at the present time is 111, while the index number for all commodities is 141, showing that fertilizers are cheap in comparison with other materials which the farmers must buy. In addition to these index numbers, articles and editorial comments regarding prices are frequently published. These all help in guiding farmers toward profitably programming their operations.

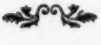
It is, therefore, very gratifying to note the following editorial regarding the price of potash, reprinted from the April 25, 1930, issue of the *Progressive Farmer*, one of the most influential farm journals, circulating widely through the South: —

" 'Cheaper potash for American farmers may be looked for in the not distant future, with the development of potash deposits recently discovered in this country,' says the United States Department of Agriculture.

"*The Progressive Farmer* has never been worried about the price of potash even though it does come from Germany and France. Commodities that come from abroad have the habit of costing us less than those produced in this country. The best way to keep down the price of potash is to keep plenty of it coming in from abroad. If it ever comes to the point that we must depend on our domestic supply of potash, even though this supply be ample, our farmers can count on paying higher prices. High prices are necessary, they say, to maintain our American standard of living.

"Potash is one of the few materials the farmer buys that is very reasonable in price. In 1910-14—prewar days—muriate of potash cost $37 to $38 per ton at the port. Today it is selling for $36 to $37. During the war, when potash imports from Germany were cut off, the price soared to as high as $400 per ton. Potash is one of the few products that sell for less than before the World War.

"No, potash prices are not unreasonable. If everything else was as reasonable in price as potash, there would be no serious farm problem."



Company Coming

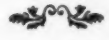
We all know the preparations in the home incident to the announcement that company is coming. Going beyond this, we are familiar with community pride in getting ready for conventions, expositions, and other public gatherings. Now comes cognizance of the commonwealth's preparations for its annual visitors, the tourists.

We were interested in recent press releases from the University of Vermont and State Agricultural College relative to conferences held to consider problems pertaining to the tourist business. People interested in the business within a radius of many miles attended sessions at Rutland, Vermont, and contributed to the general discussions on the various phases of the problem. The magnitude which the tourist business is assuming in Vermont and the future prospects of its continued increase were carefully considered. Details concerning the comfort of out-of-state visitors, attractiveness of home

grounds, and in fact all efforts which local people might put forth in caring for the wants of tourists and making them eager to come again were presented and talked over.

These conferences in Vermont are typical of the growing tendency of States to put on their best bibs and tuckers for the vast army of people who start out during each vacation season to "See America First." It is a most commendable movement and every individual should share in the civic pride which is being developed.

Our countrysides can be made more attractive to our city dwellers, our cities more hospitable to our rural folk. And in this interchange of hospitality rests a greater understanding of the problems of each.



Increased Production

The role of commercial fertilizers in improving the status of American agriculture is well understood by practical minded farmers—men who realize the necessity of cutting production costs. Much has been written and said on the subject but it remains for Dr. Oswald Schreiner, chief of the Division of Soil Fertility of the Bureau of Chemistry and Soils, U. S. Department of Agriculture, to clearly set forth with recent data just how important is a more universal use of fertilizers.

"If all the fertilizer—7,500,000 tons of it—used annually by farmers of the United States were sold in bags it would take nearly a hundred million of them," says Dr. Schreiner. "The use of chemical fertilizers is one of the best means of increasing productivity and improving soil fertility. It is conservatively estimated that for every dollar invested in fertilizer the average return is about three dollars. The reason that farmers are buying 250 million dollars worth of fertilizer a year is that the best farmers of the country know that it pays them to use fertilizers."

Summing up the relation of fertilization to farming under present economic conditions, Doctor Schreiner says: "With the present high cost of labor, increased acreage is not so advisable as increased production per acre. Under present costs of production the proper use of fertilizers offers one of the best ways for the American farmer to increase his farm income. An acre of underfed plants, struggling for growth and reproduction, means not more, probably less, than an average yield of crops, the selling price of which is absorbed to meet the costs of interest, taxes, cultural operations, and seed. If there is to be any profit it must come from a higher yield. Therefore it is better to produce a high and profitable yield on less acreage than an average yield on the full acreage. This is true of all crops."

Doctor Schreiner says that intelligent application of lime and complete fertilizers makes it easy to double or triple yields of pasture grasses and—— a point which is more important but is often overlooked by dairy farmers—to increase by this means, the protein, lime, and phosphorus content of the grasses. Such forage often improves the health of the stock and insures against mineral deficiency diseases and nutritional abortion.

Doctor Schreiner warns farmers that they must not expect fertilizer to work magic or to make up for shortcomings of crops, soils, poor seed, inefficient spraying, poorly plowed and cultivated land, poor drainage, acid soil, or for a low supply of humus.

"Use manure to improve your soils. Grow green manure when you can

not get stable manure. Then you will have better returns from your fertilizer," he advises farmers and points out that there is a specific quantity of fertilizer which yields the maximum profit in any given case and the amount varies greatly with different crops and different soils, and is greater, by far, for high-priced crops than for low-priced crops.

Traditions

So treasured are some of our traditions that we are enslaved by them to the extent that progress is greatly delayed and sometimes prevented. A great many progressive movements are held in abeyance for a lack of precedence, the result being that our minds are so bound up with visions of the past that we cannot see clearly into the future.

In our agricultural life customs and practices have delayed progress just as seriously as has tradition in our social and political lives, the result being that we have found out many of our best ideas by accident rather than by careful planning. When commercial fertilizer first came into use, many declared that it would kill the land and that once used it would have to be continued.

A southern farmer who thought that he was a great fertilizer enthusiast once sent a negro out to apply fertilizer to a cotton field. When the farmer returned from town he found that the negro had applied three times as much fertilizer to the field as he had intended. He censured the negro very severely and threatened to fire him. He considered that the ignorant old darky had temporarily ruined the field, but finally he decided to plant it to cotton. The accident proved a blessing in disguise and this farmer, for the first time in his life, made a bale of cotton per acre.

So pleased was he at picking time that he presented old John, the negro who didn't follow precedence or even know what it was, with a new suit of clothes. This ignorant negro opened the eyes of the whole community and showed them the way to greater profits. Old John made a mistake, but his "Marster" made cotton.

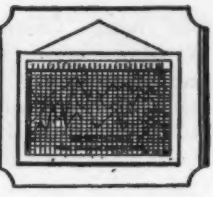
The Phosphorus Digest

The "Phosphorus Digest" is the new publication of the Superphosphate Institute, Washington, D. C. The purpose of the "Digest" is to bring the results of current field and laboratory investigations regarding phosphorus to the attention of those most interested. As the subhead says, it is "A Monthly Review of Recent Investigations of Interest to all Agricultural Workers."

The "Digest" gives the results obtained from the experimental work with crops and fertilizers and notes particularly the profitable effects of phosphorus, under the headings, Field Crops, Truck Crops, Fruit, and General.

The magazine is well illustrated and printed and, undoubtedly, this additional source of authentic information will be welcomed by our agricultural extension workers.

AGRICULTURAL DEVELOPMENTS



By L. C. Farle

A NEW CARROT

A new variety has been added to the list of garden vegetables through the work of Victor A. Tiedjens, a member of the research staff of the Massachusetts Agricultural Experiment station at Waltham, Massachusetts. Seed is being distributed as rapidly as it can be obtained and it is hoped that the new variety will take the place of certain other kinds on the market. The station at Waltham expects to have 1,000 pounds of seed for distribution by next year.

In addition to the new variety of carrot, a mildew-resistant variety of head lettuce has been developed at the station which will replace all other greenhouse varieties grown in Massachusetts this year. Besides developing these two new varieties of vegetables, Mr. Tiedjens is working on the developments of squash, cucumber, corn, asparagus, and bean plants. Mr. Tiedjens is a graduate of the University of Wisconsin in 1925.

MORE GRADED TOMATOES

Farmers in Pennsylvania sold over two and one-half times the tonnage of tomatoes to canners on the basis of Federal Grades during the past season as were sold by grade in 1928, according to records of the Bureau of Markets, Pennsylvania Department of Agriculture. More than 2,330,000 pounds of tomatoes were graded by State inspectors during the past season compared to 905,000 pounds in 1928.

Six canneries in Pennsylvania have adopted the graded system of purchasing all tomatoes under State supervision. This system is found to pay good dividends to the producers of a high quality product, since the return is based entirely on quality. The best indication of the success of the new system is shown by the fact that canneries using this method of purchase are receiving the tomatoes from an increasing acreage while other canners are finding it more difficult to secure sufficient acreage for their needs, the Bureau states.

UDOBRENIE I UROJAI

A new journal under the above name, meaning "Fertilization and Crop Yields" or better "Better Crops With Plant Food," has been published in Moscow by the Committee on Chemistry of the Soviet of Commissars and the Scientific Fertilizer Institute. The first two numbers have just been received in America. The Editorial Board, headed by Professor E. B. Britzke and L. L. Balasheff, announced that the monthly journal will be devoted to the various problems of fertilization, also chemical warfare with pests and diseases of plants.

THE CARE OF THE LAWN

There are some lawns that no amount of fertilizing will ever make perfect, according to a recent issue of Nature Magazine. The fault here, and it is an exceedingly common fault, is in attempting to grow grass on the infertile clayey subsoil cast up when

the house foundations were excavated, to which frequently has been added masses of waste building material. It is almost hopeless to attempt to grow grass on so poor and unnatural a foundation—about the only thing that can be done to produce a good turf under such conditions is to add a layer of good top-soil and start all over again. Fortunately, the layer need not be very heavy—two inches are sufficient for all practical purposes—since grass roots do not ordinarily penetrate very deeply.

It is a mistake to spade fertilizer into the ground to a depth of six inches or more since most of this plant food, below a depth of an inch or two is simply wasted. The more important of our turf grasses are surface growers.

SECOND EXTENSION SCHOOL

The University of Wisconsin will again this year be host to agricultural extension workers from all over the United States who wish to study methods for improving their work.

The 1929 course at the Badger institute was the first opportunity ever offered extension workers in this country to pursue graduate study in their profession. The extension school attracted wide interest and attention. Workers came from 11 States and an equally scattered representation is expected in 1930, according to Dean J. A. James of the Wisconsin College of Agriculture.

The United States Department of Agriculture will again assign M. C. Wilson to present the results of research studies which he has conducted during the last five years in 17 States.

Because agricultural extension work in the past 15 years has developed from a meager background to a well defined profession, it has been felt that much valuable information in regard to methods and technique of extension teaching has been accumulated, and that this fund of knowledge should be made available.

The course may be taken for either undergraduates or graduate credit. It will deal with ways of measuring extension progress, methods of collecting research data relating to extension, the influence of size of farms, land tenure, educational training, age, contact with extension workers, and other factors upon effectiveness of extension teaching.

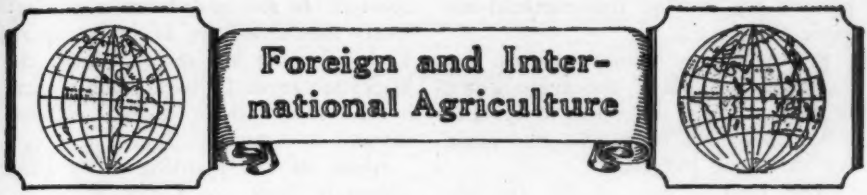
The various means and agencies employed—result demonstrations, method demonstrations, meetings, informational material in the press, personal service, bulletins, exhibits, circular letters, schools, and radio—will be analyzed from the standpoint of their functions in teaching, adaptability to particular subject matter, relative influence, cost, interrelationship, and how they may be made more effective.

Attention will be given to the problems of program determination, leader training, extension campaigns, educational principles underlying extension teaching, office management, and other problems.

FIFTY-SIX YEARS OF ONIONS

In a recent survey of the muck areas in New York State, it was discovered that F. J. Kurowsky, a farmer in Orange County, owns a piece of muck from which was harvested this year the 56th successive crop of onions. There are other records showing that onions can be grown on the same ground for a long period of years provided disease is kept under control and the fertility of the soil is maintained. However, a yield of more than 700 bushels per acre in the 56th year of continuous onion production from this muck denotes careful management. The land is manured every other year, green crops are plowed under, and each season an application of a ton per acre of a 2-8-10 fertilizer is made.

Some of the busiest people in the world are only picking up the beans they spilled.—*Exchange.*



Potatoes in England

By A. E. Wilkinson

Vegetable Specialist, Connecticut Agricultural College

IT was my good fortune recently to have the opportunity to visit the large potato area in Lancashire, England. Lancashire is just north and East of the city of Liverpool and is a very interesting farming country for one to visit. The fields are large, either level or very gently rolling and the soil is particularly well adapted to this crop. Almost 20 per cent of all the potatoes raised in England are raised in this section.

The largest yield per acre for potatoes in England has been secured in Lancashire. During the last 10 years the average yield on many farms in this section has been approximately seven tons. This does not mean seven American tons of 2,000 pounds but it means seven tons of 2,240 pounds, or as we express it in American bushels about 260 bushels per acre.

Comparisons

It is of interest to compare the growing of potatoes in this section with methods employed in this country. The soil is a heavy loam but there also is found, particularly near Ormskirk and Southport, a lighter soil of a reddish color. Much of the soil has a relatively high water table, which is a decided aid in potato growing.

The common rotations practiced in this section are potatoes followed by winter wheat, followed by grass or oats, followed by potatoes. There are, of course, modifications in this practice such as planting early cabbage on the land following grass and following the early cabbage with sprouted potatoes. Another practice is to allow the land to be fallow, giving fallow culture. Follow that with potatoes or oats, then wheat, then back into regular rotation.

If the land to be plowed for potatoes is grass land, it is generally fall plowed. The furrows are allowed to remain over winter in a plowed condition. If the land is not grassed, it is generally spring plowed. The soil is very thoroughly prepared, and at the time of planting potatoes, furrows are made in the soil as close as 27 inches apart. In these furrows stable manures are applied. Most of this stable manure is purchased and costs approximately $3.00 per ton and has to be carted to the farm. About 15 tons are needed per acre. When the furrow has been filled with the stable manure a hiller or the plow is used to cover this material.

The growers using commercial plant food use a complete fertilizer made up as follows: In a ton of 2,240 pounds —2 parts of superphosphate, 1½ parts of sulphate of ammonia, 1 part of sulphate of potash, and one-half part of steamed bone. This is used at the rate of 700 pounds per acre where the stable manures are used and where a very limited amount of stable manures is used, or none at all, 1,200

pounds per acre of this material are used.

A bow harrow is now used on this furrow. It knocks the ridge down slightly and also fines the lumps and kills the weeds. It may be used again for this same purpose.

The land is now ready for the planting of the potatoes. The amount of seed used is about 1,500 pounds per acre. The preference is for big seed pieces. The general belief is that the big seed piece will give a larger yield. This is in accord with the American belief. Very little is known of certified seed as we know it here. What is meant in the Lancashire section of England as certified seed is first, trueness to type; second, immune to the wart disease and produced on clean land not affected with wart. It is interesting to know about their seed, that only certain varieties such as Ker's Pink, Great Scott, or Ninety Fold can be used. I say can be used because the law in that section which is enforced is to the point that only potatoes immune to wart disease are allowed to be planted.

There is an Experiment Station located in this section that determines just which sorts are wart free and instructs the growers accordingly. The seed is cut from the seed end to the stem end and in many instances a portion of the stem end is cut off and used for pig feeding or for other purposes. Many fairly large potatoes are only cut in three pieces. Practically all seed is cut by hand. The potatoes are cut just previous to planting, and the planting date is in March.

Plant Late Varieties First

The planting practice is slightly different from that in our country. The late potatoes are seemingly planted first because as a general rule these are not sprouted. The early potatoes are planted in April and in almost every instance are sprouted previous to planting. The spacing of potatoes is very much different from ours. The late potatoes are spaced 18 inches apart in the row and the rows as previously mentioned are 27 inches apart. Early potatoes are spaced closer, the pieces are from 10 to 12 inches apart in the row and 27 inches between rows.

Much of the planting is by hand although there are a few machines. As most of the work in that section is with one horse, the planter is a one-horse type. One man drives the horse, another is seated at the rear of the machine, and at the right of this man an endless chain with cups is found. This chain is quite near the wheel on that side. In each one of the cups, one piece of potato is placed; and as the cups are spaced on the chain correctly, the potatoes are spaced in the soil correctly. It operates very much as our machines do after the potatoes are in it.

Free From Pests

As soon as the potatoes come up and are from one inch to two inches tall, a scarifier, or what we call a weeder, is used. This is worked the same way as the rows or ridges extend. A little later it is used again even when the potatoes are quite large size. Hand weeding and frequent cultivations with just a tendency to hill are practiced.

The potato growers in this section know little or nothing about spraying as compared to our American practices. In fact I did not see a good spray equipment in the entire section. In talking with the men, there were only a few who knew anything about blight or anything about some of our most common pests such as lice, potato bugs, flea beetles, rhizoctonia, etc. They are to be congratulated; our close knowledge and special corrective needs are expensive.

In many of the early fields towards the end of the season, not only between the rows is a cultivator used but also a deep soil-working tool such as a sub-soiler is used to loosen the soil to a considerable depth. Half

(*Turn to page* 60)

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

"Fertilizers for Tobacco" is the title of Bulletin 413, the most recent treatise on Tobacco from the Wisconsin College of Agriculture. The authors, James Johnson and W. B. Ogden, treat the subject broadly and in a most practical manner. They do not accept the general belief that more or better fertilizer is the panacea for all ills of the tobacco crop. The chief object of the bulletin appears to be to emphasize the importance of all soil factors involved, in an effort to effect adaption of a sound and practical farm program. The suggestions of the authors for such a program call for proper rotation, proper soil type, disease-free soil, disease-resistant seed, moderate use of manure, proper use of well-balanced complete fertilizers to supplement manure, and careful attention to sources of potash. Wisconsin tobacco growers should find this information both interesting and profitable.

The use of sulphur as a soil supplement has been regarded in the past by many investigators as a necessity. Results of six years' experimental work by the Texas Experiment Station where sulphur was applied in varying amounts on a variety of soils and crops do not warrant its use under Texas conditions as a fertilizer. Complete results of this work and a review of experimental work in several other States are published in Texas Experimental Station Bulletin No. 408, "The Effect of Sulphur on Yield of Certain Crops," by E. B. Reynolds.

"Commercial Fertilizers Agricultural Minerals, (1929)," *State of Calif., Sacramento, Calif., Spec. Pub.* 98.

"Fertilizer Registrations for 1930," *Agr. Exp. Sta., New Brunswick, N. J., Bul.* 495, *Jan.,* 1930, *Charles S. Cathcart.*

Soils

A valuable contribution to our knowledge of basicity and acidity of soil is made by the Department of Chemistry of the Texas Experiment Station in Bulletin 400, the title of which is "The Basicity of Texas Soils," by G. S. Fraps and E. C. Carlyle. It is a common knowledge that basicity and acidity are closely related to agricultural value of soils. Basic soils are generally better suited to growing of crops than acid soils. This bulletin should prove of interest to teachers and investigators interested in a study of short methods for determining acidity, basicity, and buffer capacity of soils in all parts of the country.

The efficiency of tillage implements depends to a large extent upon their design, with special relation to certain physical properties of soils which are ever present. .Tillage, the greatest power-consuming operation on the farm as influenced by implement design, is treated exhaustively in Bulletin 229 by M. L. Nichols of the Alabama Experiment Station. "Methods of Research in Soil Dynamics as Applied to Implement Design" are presented and should prove of immense interest and value to manufacturers of tillage implements as well as soil technologists.

"Properties of Soils Which Influence Soil Erosion," U. S. D. A., Washington, D. C., Tech. Bul. 178, March, 1930, H. E. Middleton.

"Soil Survey of The Salinas Area, California," U. S. D. A., Washington, D. C., No. 11, Series, 1925, E. J. Carpenter and Stanley W. Crosby.

"Soil Survey of Wilson County, North Carolina," U S. D. A., Washington, D. C., No. 10, Series, 1925, R. C. Jurney and W. A. Davis.

"Soil Survey of Moody County, South Dakota," U. S. D. A., Washington, D. C., No. 2, Series, 1926, W. I. Watkins and G. A. Larson.

"Soil Survey of Hidalgo County, Texas, U. S. D. A., Washington, D. C., No. 13, Series, 1925, H. W. Hawker, M. W. Beck, and R. E. Devereux.

"Soil Survey Cameron County, Texas," U. S. D. A., Washington, D. C., No. 17, Series, 1923, M. W. Beck and B. H. Hendrickson.

"Soil Survey of Monroe County, West Virginia," U. S. D. A., Washington, D. C., No. 15, Series, 1925, J. A. Kerr.

Crops

One of the most interesting of the new bulletins which have come into circulation during the past month is Bulletin 414, University of Wisconsin, Madison, February, 1930, by G. B. Mortimer and the late Griffith Richards. "Permanent pastures in Wisconsin can be improved," the bulletin starts out. The following 28 pages are devoted to telling how and why. Excellent photographs on the experimental work done aid in the ease of reading this valuable information. Regarding the results of fertilizing, the authors state that perhaps the most significant observation to be made is that the largest yields were associated with the use of potash. Lime, phosphate, and potash gave significant increases on an old worn pasture on Miami silt loam. Lime alone gave 15.6 per cent increase; lime and superphosphate, 42.6 per cent; and lime, superphosphate, and potash, 153.2 per cent. On soils low in mineral fertility, nitrogen fertilization is not economical.

"Proceedings of the Sixty-second Convention of Fruit Growers and Farmers," Calif. Dept. of Agr., Sacramento, Calif., Vol XIX, No. 2, February, 1930.

"The Home Vegetable Garden," Colo. Exp. Sta., Fort Collins, Colo., Bul. 357, Feb., 1930, A. M. Binley.

"Ideal Types for Colorado Standard Potato Varieties," Colo. Exp. Sta., Fort Collins, Colo., Bul. 359, Feb., 1930, C. H. Metzger.

"The Causes of Degeneration of Irish Potatoes in Connecticut," Agr. Exp. Sta., Storrs, Conn., Bul. 160, Oct., 1929.

"Report of the Director for the Year Ending June 30, 1929," Agr. Exp. Sta., Storrs, Conn., Bul. 162, Nov., 1929.

"Lawns in Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 209, Dec., 1929, C. R. Enlow and W. E. Stokes.

"Apprenticeship Practice in Training Teachers of Vocational Agriculture," Ga. State College of Agr., Athens, Vol. XVIII, Bul. 378, Jan., 1930, John T. Wheeler.

"Gardening for Health," Ga. State College of Agr., Athens. Ga., Vol. XVIII, Bul. 380, Jan., 1930, T. C. Morcock.

"Five-acre Corn Production Contest, 1929," Ga. State College of Agr., Athens, Ga., Vol. XVIII, Bul. 382, Feb., 1930, E. D. Alexander.

"Report of the North Louisiana Experiment Station for the Years 1928-1929," No. La. Exp. Sta., Calhoun, La., Bul. 204, Mar., 1930, Sidney Stewart.

"Report of the Rice Experiment Station for the Years 1928-1929," Rice Exp. Sta., Baton Rouge, La., Bul. 205, Mar., 1930, J. Mitchell Jenkins.

"Report of the Fruit and Truck Experiment Station for the Years 1928-1929," La. State Univ., Baton Rouge, La., Bul. 206, Mar., 1930, B. Szymoniak.

"Cannery Tomatoes—Results of Three Years' Tests of Varieties," Agr. Exp. Sta., College Park, Md., Bul. 318, Dec., 1929, Fred W. Geise.

"The Quarterly Bulletin," Agr. Exp. Sta., East Lansing, Mich., Vol. XII, No. 3, Feb., 1930.

"American Potato Journal," The Potato Association of America, East Lansing, Mich., Vol. VII, No. 3, Mar., 1930.

"Weeds of New Jersey," Agr. Exp. Sta., New Brunswick, N. J., Cir. 219, Sept., 1929, Jessie G. Fiske.

"Geneva, A Greenhouse Cucumber That Develops Fruit without Pollination," Agr. Exp. Sta., Geneva, N. Y., Bul. 580, Feb., 1930, Leslie R. Hawthorn and Richard Wellington.

"Ohio Agricultural Experiment Station," Wooster, Ohio, Bimonthly Bulletin, No. 143, Mar.-Apr., 1930.

"Forty-eighth Annual Report for 1929-29," Agr. Exp. Sta., Wooster, Ohio, Bul. 446, Feb., 1930.

"Soybeans for Oklahoma," Agr. Exp. Sta., Stillwater, Okla., Exp. Sta. Cir. 77, Mar., 1930, B. F. Kiltz.

"The Effect of Selection in the Tomato," Agr. Exp. Sta., State College, Pa., Bul. 248, Jan., 1930, C. E. Myers and M. T. Lewis.

"Cotton Variety Tests—1929," Agr. Exp. Sta., Clemson College, S. C., Cir. 40, Feb., 1930, W. B. Rogers and E. E. Hall.

"Three New Varieties of Lespedeza," Agr. Exp. Sta., Knoxville, Tenn., Cir. 30, Mar., 1930, S. H. Essary.

"Virginia Department of Agriculture and Immigration," Richmond, Va., Bul. 268, Apr., 1930.

"Thirty-Ninth Annual Report for the Fiscal Year Ended June 30, 1929," Agr. Exp. Sta., Pullman, Wash., Bul. 237, Dec., 1929.

"Rotation and the Tobacco Crop," Agr. Exp. Sta., Madison, Wis., Bul. 412, Jan., 1930, James Johnson and W. B. Ogden.

"Forest Nursery and Planting Practice in the California Pine Region," U. S. D. A., Washington, D. C., Cir. 92, Jan., 1930, S. B. Show.

"Federal Legislation, Regulations, and Rulings Affecting Land-Grant Colleges and Experiment Stations," U. S. D. A., Washington, D. C., Dept. Cir. 251, Apr., 1923, revised Feb., 1930.

"Oats in the Western Half of the United States," U. S. D. A., Washington, D. C., Farmers' Bul. 1611, Dec., 1929, T. R. Stanton and F. A. Coffman.

"Vegetative Propagation from the Standpoint of Plant Anatomy," U. S. D. A., Washington, D. C., Tech. Bul. 151, Dec., 1929, J. H. Priestley and Charles F. Swingle.

"Investigations in Weed Control by Zinc Sulphate and Other Chemicals at the Savenac Forest Nursery," U. S. D. A., Washington, D. C., Tech. Bul. 156, Jan., 1930, W. G. Wahlenberg.

"Master Teachers of Vocational Agriculture," Federal Board for Vocational Education, Washington, D. C., Mon. No. 8, March, 1930.

"List of Bulletins of the Agricultural Experiment Stations for the Calendar Years 1927-1928," U. S. D. A., Washington, D. C., Misc. Pub. 65, Jan., 1930, Catherine E. Pennington.

Economics

More and more is the government called upon to give services that were formerly provided by individuals or were not available. For instance, toll roads have given way to public roads. The increase in the services performed by governments necessarily means increased taxation. "The Cost of Government in Massachusetts 1910-1926," bulletin 256 by Hubert W. Yount and Ruth E. Sherburne of the Massachusetts Agricultural Experiment Station, is an interesting study of government costs in this commonwealth. The bulletin is very useful in showing the things which have happened in this State because it undoubtedly indicates trends applicable to other States.

"Cherries," Agr. Exp. Sta., Berkeley, Calif., Bul. 488, Feb., 1930, H. R. Wellman and E. W. Braun.

"Some Evidences of Economic Progress," Ga. State College, Athens, Vol. XVIII, Bul. 384, Feb., 1930, Dr. Andrew M. Soule.

"Farmers' Cooperation in New Jersey, 1926," Agr. Exp. Sta., New Brunswick, N. J., Bul. 487, Oct., 1929, Charles B. Howe.

"Farm Family Living Among White Owner and Tenant Operators in Wake County," Agr. Exp. Sta., Raleigh, N. C., W. A. Anderson.

Insects

"The Rosy Aphid in Relation to Spray Practices in 1929," Agr. Exp. Sta., Geneva, N. Y., Bul. 582, Feb., 1930, P. J. Parrott and Hugh Glasgow.

"The Oriental Fruit Moth," Agr. Exp. Sta., Clemson College, S. C., Cir. 38, Feb., 1930, C. O. Eddy, M. H. Brunson and W. H. Clarke.

"Control of the Mexican Bean Beetle for 1930," Agr. Exp. Sta., Clemson College, S. C., Cir. 39, Mar., 1930, C. O. Eddy and W. H. Clarke.

"Sweet Potato Sawfly," Va. Truck Exp. Sta., Norfolk, Va., Bul. 68, July, 1929, P. J. Chapman and G. E. Gould.

"The Mexican Bean Beetle and its Control," Va. Truck Exp. Sta., Norfolk, Va., Bul. 70, Jan., 1930, Neale F. Howard and L. W. Brannon.

Diseases

"Angular Leaf Spot and Fruit Rot of Cucumbers," Agr. Exp. Sta., Gainesville, Fla., Bul. 207, Oct., 1929, George F. Weber.

"Cucumber Diseases in Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 208, Revision of Bul. 177, Nov., 1929, G. F. Weber.

"Corn Diseases in Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 210, Jan., 1930, A. H. Eddins.

"Some Common Tomato Diseases and Their Control," Agr. Exp. Sta., Knoxville, Tenn., Cir. 31, Mar., 1930, S. H. Essary.

"A Comparison of Wilt Resistant Tomatoes in Virginia," Va. Truck Exp. Sta., Norfolk, Va., Bul. 69, Oct., 1929, Frank P. McWhorter and M. M. Parker.

"Inheritance of Fusarium Wilt Resistance in Canning Peas," Agr. Exp. Sta., Madison, Wis., Research Bul. 97, Dec., 1929, B. L. Wade.

The Winogradsky Test

By Anthony T. Koelker

Ames. Iowa

A NEW method of studying nitrogen-fixing bacteria in the soil has been experimented with successfully by R. H. Walker, assistant chief in soil bacteriology, at the Iowa Agricultural Experiment Station. This new method, called the spontaneous culture method, was devised by Winogradsky, a noted Russian bacteriologist at Pasteur Institute, Paris, just recently. Relatively little work had been done on it in this country until the past year when Walker began his tests.

He found that this method is especially valuable in studying the occurrence and activities of nitrogen-fixing bacteria in their natural habitat. It indicates the suitability of various soils for crop production due to the fact that soils that are suited for the development of these organisms are also suited for good crop production.

From all appearances the new method of studying the nitrogen-fixing bacteria involves the simple making of a "mudpie." Five grams of starch are added to 100 grams of soil and then mixed into a thick paste, the surface of which is glazed, or patted smoothly over the top. Walker states that this mixture of starch and soil widens the carbon-nitrogen ratio and stimulates the growth of bacteria that are able to take their supply of nitrogen from the air.

Ordinarily common bacteria will grow in a substance containing 10 times as much carbon as nitrogen. But with the widening of the carbon nitrogen ratio, due to the starch, there is a large excess of carbon. Those organisms that get nitrogen from the air are the only ones that can grow successfully in this mixture. Hence, this "mudpie" is especially well fitted for growth of nitrogen-fixing bacteria, and as a result more conclusive experiments can be made.

After the surface of the mixture has been glazed, colonies of bacteria develop on it similarly to the manner in which they develop on agar, a jelly-like substance used in bacteriology experiments which is peculiarly adapted to the successful growth of micro-organisms.

The older method, which has been used extensively, involves the inoculation of 10 grams of soil into a nutrient solution of sugar.

The spontaneous culture method may afford a better means for testing the lime and phosphorus needs of soils, whereas by the older method it was impossible to determine these requirements. These needs will be indicated by the type of growth on the soil surface of the "mudpie." One portion of the substance is treated with lime, another with a phosphate, and a third part with both lime and phosphate. The resulting growths on these plots show which treatment produces the best results.

This additional information makes the newer method more practical, simple, and conclusive than the older and indefinite method, thus making it a beneficial change in research work in the field of soil bacteriology.

EDITOR'S NOTE:—*There is also a paper on this subject entitled "The Direct Method in Soil Microbiology and Its Application to the Study of Nitrogen Fixation," by S. Winogradsky of the Institute Pasteur, France, in the January, 1928, issue of Soil Science, Volume XXV, No. 1. Considerable interest has been aroused in Colorado by experimental work with the Winogradsky test, by Dr. W. G. Sackett, Bacteriologist. Dr. Sackett has been applying the test to soils all over the State and in a short time will publish his findings. In connection with his studies in certain districts in the State of Colorado, deficiencies in potash and phosphorus were found.*

Sweets *for* Exhibit

By H. S. Benson
County Agent, Vincennes, Indiana

A FEW years ago it would have taken no small amount of courage to advocate to the growers of sweet potatoes of Busseron Township, Knox county, Indiana, that they feed their soil a liberal amount of fertilizer to produce quality sweet potatoes. Today, through the leadership of the vocational boys supervised by B. T. Bond of the Oaktown High School, the growers are wanting to know the kind and amount to use.

The vocational boys have led the way through their sweet potato 4-H club by not only producing the potatoes, but in making an exhibit at the county Indoor Fairs, and by marketing the crop cooperatively and securing a premium for it. The success of the production and marketing of the sweet potatoes by the 20 vocational boys lies in being able to produce a large per cent of potatoes that grade U. S. No. 1, which not only yield better but cost less per bushel to produce.

The use of 500 pounds per acre of fertilizer analyzing 3-10-12 increased the yield of No. 1 potatoes 128.9 per cent and the crop yield 104 per cent, at a total cost of $11.08, making a profit of about $90 per acre.

In a study of yields from different members of the vocational class, those using fertilizer obtained yields from 244 to 315 bushels per acre, with an average of 274 bushels. The yields of non-users of fertilizers ranged from 52 to 166 bushels, or an average of 118 bushels, making a difference of 156 bushels in favor of the users of fertilizer.

The members of the class who used fertilizer had no trouble in securing a uniform grade and presenting a package of pleasing appearance to the buyer. Their potatoes were smoother, better shaped, showed less disease, and the kind that the housewife likes to buy for her family dinner.

These young future farmers are leading the way, and all other growers are watching and following their lead, with the result that all are planning to use disease-free treated seed on clean ground and with a liberal amount of well-balanced fertilizer for their 1930 crop.

The New Yearbook of Agriculture

The annual Yearbook of Agriculture published and distributed by the United States Department of Agriculture is now in circulation. Like its predecessors, the volume is a gold mine of recent scientific, technical, and economic information on American agriculture, presented most attractively illustrated and indexed for latest reference. The whole is as complete a picture of what is being done to better the agricultural industry in the United States as possibly can be found anywhere.

A change has been made this year in that the present volume is called "Yearbook of Agriculture 1930," designating the year in which it is printed rather than the year of activity which is surveyed. The new system of dating more truly indicates the strictly up-to-date quality of the volume. This procedure does not break the continuity of the statistical and other material published, nor does it involve any omission in the Yearbook series.

Led by a Boy

(*From page 26*)

This crop was produced with no regular potato machinery except a planter. This necessitated a greater expenditure of money for labor and a consequent increase in cost per bushel.

The project was well planned and well executed as the results show, and has led to increased potato plantings in this section, particularly an increase in the use of nitrogen and potash fertilizer. Until this project was run hardly any potash fertilizer was used. The increase in the use of these fertilizers has increased our production and will continue to increase it, making a greater net income for the farmer.

Staked Tomatoes

(*From page 25*)

the roots.

The third step consists of driving a stake into the ground close to each plant. This stake will need to be at least three inches away from the plant so as to injure the root system as little as possible. Rows of staked tomatoes running north and south are said to be more apt to produce sunburned fruits than those running east and west. Where it is convenient to arrange for such plantings, it is best to do so. The shade from one plant protects those next to it more when the rows are east and west.

These stakes can be secured from the woodlot or can be purchased at a lumberyard. Six or seven feet is about the right length for these stakes. An inch by one and one-half inches is the approved thickness for stakes. As soon as the plants are 12 or more inches

high, they can be tied to the stakes. Space between the stake and the stem of the plant is allowed for the stem's enlargement. Some soft cloth or twine is used in tying. The string is used to hold the plant stem close to the stake; no attempt is made to keep the string from slipping down the stake. A new string is used for every 12 inches or so in the height of the plant.

Suckers appear on the tomato plants. When plants are grown on stakes it is necessary to remove them to prevent over-crowding the planting. A sucker appears in the axil of every leaf. It is easiest to remove these while they are very small. They are easily located between the main stem and every leaf and can be pinched out by hand.

Tomatoes grown on stakes will contine to bear fruits until killed by diseases or by frost. A good early variety such as the Bonny Best is preferred by most gardeners. Where wilt infested soils are used, the Marglobe variety is planted.

The plan suggested for growing tomatoes on stakes will, if tried out, lend attractiveness to the garden and to working in the garden. It is a practical way of economizing on space and at the same time improving the quality of the garden tomato fruits. It also speeds up the time when the gardener can eat his first home-grown tomato. The early fruits are picked more often than not from the staked and suckered tomato plant.

Pastures

(*From page* 28)

much less attention than our cultivated crops. For a long time American agriculture expanded its crop acreages pretty largely at the expense of pasture. When land was once taken out of the wild pasture only a small portion of it has usually gone back into grazing use. Only about one-tenth of the area of our improved land is used for rotation or permanent pasture.

Recently, however, the agricultural industry has come to a fuller realization of the value of pastures in the livestock industry. Pasture is now known to be the most economical source of feed for milk production. It furnishes a balanced ration at a relatively low cost, and the cow does her own harvesting, leaving at the same time a fair amount of original soil fertility absorbed by the plants on the land. From now on it is very probable that the better pastures will not be left to themselves to anything like the degree that they have been disregarded in the past.

Even the pasturing of mature crops on cultivated land is more and more finding a place in our agriculture. Increasing acreages of corn, cowpeas, velvet beans, peanuts, soybeans, and other crops now are harvested by grazing. The animal does the harvesting in a fairly economical manner and removes much less of the original fertility from the soil. According to the census of 1920, there were harvested by the pasture method 2,350,000 acres of corn, about 1,000,000 acres of cowpeas, about 800,000 acres of velvet beans, 1,125,000 acres of peanuts, and 174,000 acres of soybeans.

Our pasture plants are of many kinds. Native grasses are abundant in some sections, but more and more tame grasses and clovers are supplementing and replacing the native grasses. Of the tame grass plants probably the most used in humid regions are blue grass, white and alsike clover, red clover, timothy, and alfalfa. Practically all of these were introduced from Europe, the blue grass coming over with the early French settlers and spreading through-

out the humid pasture areas of the Northern and Central United States. In the Southern States most of the grasses and clovers suitable to the humid Northern section have not proven satisfactory and the livestock development of the south has been handicapped by a lack of suitable pasture plants. The accidental introduction of such plants as Bermuda grass, carpet grass from the West Indies, and Lespedeza from Japan has brought about a marked improvement in the Southern pasture outlook.

Better management of pastures by means of more careful grazing and fertilizers will probably make rapid progress in the United States from now on. Pastures respond to care and fertilizers fully as well as most of our crops. The application, particularly of mineral fertilizers such as the phosphates and the potash carriers, has proved very effective. Lime likewise is giving good results in many areas. The reseeding of old pastures with supplementary plants such as the grasses and clovers, particularly adapted to the locality, is bringing results in many trials. The introduction of such crops as sweet clover, which produces large yields per acre and makes possible high carrying capacity, is going to be helpful in regions where these crops readily can be grown.

Study and experimentation with pasture problems are now being pushed as never before and valuable information is being accumulated. The years just ahead will probably add much to our knowledge of the subject of pasture and result in much improvement in our pasture management.

Opportunity

(*From page* 30)

The "Twin Buttes Seed Farm" takes its name from two hills or buttes behind the Wagner house. The farm now has a seed cleaning plant which is more modern than the ones in many city warehouses. Some of the machines have been bought and some built. They are all connected with hoppers and elevators so that hard work is cut down to a minimum.

From a moderate start with a few acres of grass seed in 1922, the business has now grown until Mr. Wagner needs a full-time bookkeeper. Telegrams and long distance calls come in from everywhere, just like a city business. Mr. Wagner does not do any retail trade. He says he can make more money by selling a carload of seed by a telegram than he can by selling it out in little dabs for 10 cents a pound. Trips 10 miles to town and back cost money and he can't bother with them.

He says, "There isn't anything particularly remarkable about the growth of this seed business. It is a specialized business and there aren't so many in it as there are in wheat for instance. A firm 4,000 miles away can depend upon my quality as well as a firm right here. Maybe my policy of always trying to give them a little better stuff than they expect has helped in getting contracts, but it seems to me that the big reason for the present size of my output is because I have never been afraid to take on all the business I could get.

"Whenever old Dame Opportunity knocks I ask her in and don't let her stand there waiting. If she tells me I can grow 500 acres of Austrian peas, I look around and see if that can't be stretched to 5,000 acres. If I can talk with an Atlantic Coast firm in terms of all they will need of a certain kind of seed, they begin to sit up and take notice."

Peat and Alkali Soils

(*From page 8*)

where the alkali salts are apt to accumulate. Below the slough the two tile lines may run together. If the slough is not wide, the two lines of tile may provide adequate drainage.

Liberal application of manure on alkali soils will increase the rapidity of the removal of the alkali salts in the drainage water and will hasten the reclamation of the area. If manure is not available, other forms of organic matter such as corn-stalks, cobs, or straw may be used. Weeds, winter rye, or early oats plowed under also serve as organic matter. Sweet clover is one of the best green manure crops to plow under on alkali soils. Deep-rooted crops are the best for growing on alkali soils.

Tests conducted on three alkali fields in Kossuth county indicate that the application of muriate of potash, 200 pounds per acre, will give increased yields of 7 to 16 bushels of corn per acre, depending on the amount of alkali salts present in the soil. In one field where corn had never been grown satisfactorily 36 bushels per acre were secured when potash was applied at the rate of 300 pounds an acre and 43 bushels when 400 pounds per acre were applied. An application of 300 pounds of 0-10-10 mixed fertilizer resulted in a yield of 42.4 bushels per acre in the same field. The 400 pounds of potash, however, resulted in a larger yield in a better quality of grain, only 32 per cent of the corn being unmarketable as compared to 60 per cent of that grown on the plot treated with mixed fertilizer.

Although the actual increase in yield of corn because of fertilizer on alkali soils is not so great the increase in quality is still more important. Of the corn on the untreated plot, 73 per cent was unmarketable.

Crotalaria

(*From page 23*)

During the last four years of this same period, a test covering all of these crops except Mexican clover was run at the Citrus Experiment Station, Lake Alfred. The acre yields of nitrogen for the different crops were as follows: Crotalaria, 103.3 pounds; velvet beans, 47; cowpeas, 33.7; and beggarweed, 26.1 pounds.

With yields like this, and with millions of acres of poor soils crying for something to restore their lost vim, vigor, and vitality, it is little wonder that Crotalaria is forging to the front as a summer cover crop for soil building purposes. In addition to the nitrogen content of the plant, it supplies large quantities of much needed organic matter or humus to the soil. Five to fifteen tons of green material, the average annual yield of Crotalaria, turned into an acre of soil will result in a tremendous increase in the number of bacteria and other soil organisms necessary for plant growth. In addition, this decaying organic matter will absorb and hold moisture, making it available for the growing plants during dry weather, and will result in a more friable soil.

But after all, the acid test of a soil-improving or cover crop is its ability to effect increased yields in succeeding money crops on the same land. The cover crop has cost the farmer money to produce it, and he has received no direct return. His justification for growing such a crop is its effect on the land, and, through the land, succeeding crops from which he obtains revenue. If a cover crop turned into the soil will result in

yields of money crops sufficiently increased to pay the cost of the cover crop and still leave a profit, then the cover crop has been justified. How does Crotalaria stand up under this test?

It has proven itself to be especially good in groves and orchards. Tree crops seem able to use the plant food it furnishes, without letting a great deal of it be lost through leaching from the soil. In Florida Crotalaria has been grown extensively in citrus groves, pecan orchards, and tung-oil groves, and it has come through with flying colors in each case. In fact, it is in such groves and orchards that the crop largely is being planted at present.

Compare With Other Legumes

At the Citrus Experiment Station, Lake Alfred, Florida, Crotalaria is being tried in comparison with clean cultivation, velvet beans, beggarweed, cowpeas, Natal grass, and a rotation of legumes. A young grove, set five years ago, was divided into plots so that these various cover crops could be tested for their effect on tree growth. All plots have received the same fertilizing, cultivating, and other treatment except for the difference in cover cropping. The trees in the Crotalaria plots have made considerably more growth, in both height and circumference, than those in any other plots. In fact, the investigators declare that these trees are now receiving too much nitrogen, and they plan to reduce the quantity of nitrogen applied in the fertilizers on the Crotalaria plots.

Citrus growers who are using Crotalaria in their groves report similar results. One grower recently made the statement that he had saved $1,000 a year or $25 an acre in fertilizing a 40-acre grove where Crotalaria was grown each summer. Another grower stated that he had practically eliminated nitrogen from his grove fertilizer.

Owners of citrus groves where the trees are so big as to cover the ground almost completely, leaving little room for the growing of cover crops, are already considering plans for growing Crotalaria on near-by lands and hauling the cover crop onto the citrus grove. Some of them are doing that very thing this year.

This crop has been tried in pecan groves in Florida, Georgia, Alabama, and perhaps elsewhere. Florida Experiment Station workers report that this crop has a salubrious effect on tree growth. Indications are that the crop will result in increased nut production, also, but the tests have not been running long enough for this to be definitely announced.

Crotalaria is grown every summer in thousands of acres of tung-oil groves near Gainesville, Florida, and helps to bring the young trees into early production, at the same time lessening the fertilizer bills in connection with the groves.

While Crotalaria is especially good for tree crops, field crops are not planted soon enough after the Crotalaria begins to decay to receive full benefit from this cover crop. Particularly is this true on sandy lands, where rapid leaching takes place. Actual tests along this line have been rather few. However, the Florida Station is running more experiments on this phase.

Results Favor Crotalaria

Results of two tests have been announced by Mr. Stokes of the Florida Station. One concerns the yields of corn on some quite poor land, and shows that both velvet beans and Crotalaria practically doubled the yield of corn, while beggarweed and cowpeas caused a 50 per cent increase in yields, over a period of four years. Over a similar period, sweet potatoes planted where Crotalaria had been plowed under the preceding fall returned increased yields amounting to 40 per cent. Cowpeas, beggarweed, and velvet beans gave increased yields

of sweet potatoes ranging from 2 to 10 per cent.

Certain of the Florida Experiment Station workers believe that Crotalaria can be used to advantage to precede fall, winter, and early spring truck crops, but no tests have been made to determine this point. It is believed that the leafy vegetables, which need nitrogen, would do well following Crotalaria.

So much for Crotalaria as a cover crop. That has been the principal use of the plant to date, as livestock do not relish the plants of either the striata or spectabilis species, and thus it has not been used as a forage or feed crop. However, the ground Crotalaria plants have been fed in comparison with alfalfa meal, and found to be worth about three-fourths as much, pound for pound, as the latter. Occasionally, stock have eaten the green striata and spectabilis plants with no ill effects, although certain species of Crotalaria are poisonous to animals.

Professor G. E. Richey, assistant agronomist at the Florida Experiment Station and associate agronomist of the Forage Crops Office of the United States Department of Agriculture, is testing two species which he believes have excellent forage possibilities. These are grantiana and maxillaris. Foliage of these species is sweet, in taste strongly resembling the foliage of alfalfa. The grantiana grows to a height of about three feet and is quite bushy, producing a tremendous amount of foliage. The maxillaris grows to about three and one-half feet, but is not as bushy as the other species.

Crotalaria has already established its place in the sun as a cover crop for soil building. It is possible that in the near future it may begin to shine equally as well as a forage crop.

Legumes Bring Prosperity

(*From page* 11)

legumes into thrifty growth are finding it increasingly more difficult to get good stands. They have gradually depleted the fertility of their lands by exhaustive cropping in grain and cotton until the more particular crops like clover, alfalfa, or beans just won't do anything unassisted.

Literally millions of dollars worth of legume seed is scattered over the earth each spring with hope which in a great measure is unfulfilled. This demonstrates that farmers know what legumes will do for them, but they must learn how to insure their success.

Two essential conditions required by this family of plants must be fulfilled. First, the seed must be inoculated. Inoculation is a big word but it means a simple thing, costs a trifle, and requires only a few minutes to accomplish. Second, because legumes are able when inoculated to get a part of the nitrogen they need from the air, it has been too generally overlooked that these crops nevertheless are gluttons for the mineral plant food elements.

Few soils of this country are naturally rich enough in lime, phosphorus, and potash to supply all that these plants can transform into valuable protein. The United States Department of Agriculture places the burden of legume failures primarily on lack of fertility of the land.

To insure investments in legume seed and cash in, to the fullest, on the protein dollars which they produce it is essential to supplement the plant food of the soil by generous applications of commercial fertilizers. To be sure this entails a little more investment, but this item is insignificant in the light of the dividends which begin to accrue in less than 100 days.

Twenty years ago when clover seed

was worth only 10 cents a pound, it didn't matter so much if a seeding failed to catch. Today, with the seed worth 30 cents a pound, it is folly to plant the crop on sour or thin land. It is even more necessary that a seeding of alfalfa be provided with the conditions it requires to thrive. Even soybeans and cowpeas, which do fairly well on moderately acid soil, demand plenty of phosphoric acid and potash.

The cost of sufficient fertilizer rich in phosphoric acid and potash to insure good stands of clover or alfalfa in most cases is less than $5 an acre. If the fertilizer is applied to the small grain nurse crop with which the legume seed is sown, the profit from the increased yield of grain resulting will more than pay for the treatment. Investigations show that about 60 per cent of the fertilizer applied to a grain crop remains to nourish the succeeding crop. Hence, in reality to insure good crops of these legumes with plant food really costs nothing.

For clover and alfalfa a fertilizer containing 16 per cent or more of available phosphoric acid and at least six per cent of potash applied at the rate of from 250 to 375 pounds to the acre through a fertilizer attachment of the drill is recommended for the average soil. If the land is thin and hasn't been recently manured, it is better to use a complete fertilizer containing two per cent nitrogen.

Soybeans and cowpeas need about the same amount and kind of fertilizer as do the perennial legumes. However, they are a bit more sensitive to concentrated plant food mixtures so that it is always best to apply the fertilizer in a separate operation and mix it thoroughly with the soil before planting.

A farmer or farm adviser who reads these facts and agrees that they are sound only completes his duty when he acts upon them. Legumes in rotation boost the yields of all other crops that follow, but to keep legumes in a thrifty state they must be fed. A ton of fertilizer costing less than $30 brought better than $300 return in a four-year rotation including a legume crop as a 30-year average at the Ohio Agricultural Experiment Station. Returns such as this mean more prosperity—nothing less.

The Inquiring Mind

(*From page* 15)

but could not choke the brute. It bit and scratched his hands.

The struggle lasted for almost two hours; then Edward remembered a bottle of chloroform in a pocket of his coat, got hold of it, removed the cork, and thrust the contents down the fumart's throat. That quickly ended the fight.

Edward won. *He got the beast!* And he rejoiced that it was taken without the slightest injury to its skin.

Many more episodes of like nature might be described, but what has been said will suffice to demonstrate the "do or die" character of the man. Nothing deterred him. Always he got what he went after. There was no such world as *cannot* in his vocabulary. His enterprise and persistency were inspiring.

One might have heard him philosophically saying:

"Anyone having the mind and will, need not stick fast, even in this world. True, he may not shine so greatly as if he were better polished and better educated but he need not sink in the mire altogether."

And we can understand the incentive behind his efforts, from his own explanation. He said:

"I never succeed in describing my

unbounded admiration of the works of the Almighty; not only the wonderful works which we ourselves see upon earth, but those wondrous and countless millions of orbs which roll, both near and far, in the endless immensity of space—the Home of Eternity. Every living thing that moves or lives, everything that grows, everything created or formed by the hand or the will of the Omnipotent has such a fascinating charm for me and sends such a thrill of pleasure through my whole frame that to describe my feelings is utterly impossible."

Would that all of us were imbued with the inquiring mind and seeing eye of Thomas Edward who fought the fight of science inch by inch, until he could fight no more and, as Smiles said, "also fought the fight of honest poverty—a great triumph and a great glory!"

"The honest man, though e'er sae poor,
Is King o' men, for a' that."
Burns.

Potatoes Pay in Oklahoma

(*From page* 18)

Demonstration No. III—W. A. Loftin, Idabel, McCurtain County.

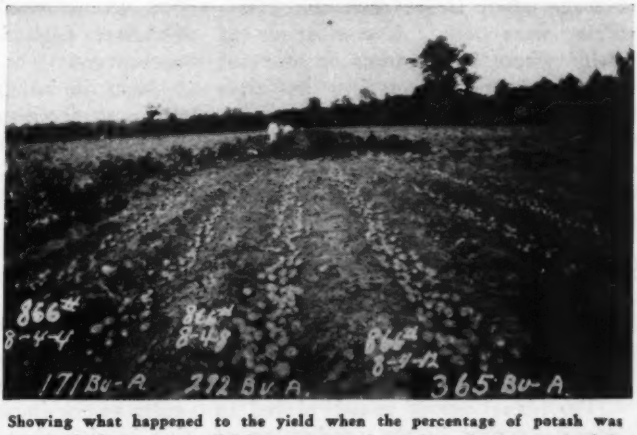
Amount of fertilizer per acre	*Analysis of fertilizer*	*Bushel yield per acre*
700 pounds	4-8-6	119
400 pounds	4-8-6	79

Thus it was seen there was a 40-bushel increase by the use of 300 additional pounds of commercial fertilizer. Forty bushels at $1.30 per bushel equals $52.00. Mr. Loftin reported $6.00 additional cost for fertilizer, thus giving a net increase of $46.00 per acre.

There are a few growers who have taken up the side-dressing of potatoes with nitrate of soda. Mr. Q. T. Bethel, Savanna, Pittsburgh county, using the Triumph variety of Irish potatoes, applied 150 pounds of nitrate of soda per acre as a side-dressing on one plot of potatoes. The acre yield was 256¼ bushels. The acre yield on the check plot was 236½ bushels. The increased yield of 19¾ bushels at $1.00 per bushel equalled $19.75. The cost of the nitrate of soda was $6.75, making a net increase of $13.00 per acre.

Cooperation

Perhaps there has been no one county in the State that has practiced co-operative grading and marketing as has Pushmataha county. The local association there consists of about 250 members who bring their potatoes into a central shed where they are graded, loaded, and sold co-operatively, and the expenses prorated to the



Showing what happened to the yield when the percentage of potash was increased from 8-4-4 (left) to 8-4-8 (center) and 8-4-12 (right).

growers. This year they have employed a manager to look after the details of the work. They marketed cooperatively 31 cars, although there was some complaint as to what they thought was a little high expense for grading and selling which amounted to 16 cents per hundred pounds. The average receipts were $1.02 per bushel.

The Fourth Oklahoma Annual Potato Tour was held June 3rd to 8th, inclusive, taking in the following counties: McCurtain, Pushmataha, Bryan, Atoka, Pittsburg, McIntosh, Muskogee, and Wagoner. We had with us on the tour Dr. William Stuart of the U. S. Department of Agriculture. Professor E. E. Isaac, Extension Horticulturist, University of Montana, and Mr. Marx Koehnke, Alliance, Nebraska, of the Nebraska Certified Potato Growers' Association.

Better Sweets

(*From page* 16)

No. 1's. The value of his crop was $490, cost of production $89, net profit $401. The fact that the 180 contestants reporting averaged a yield of 300 bushels per acre of which 176 bushels were No. 1's and that the average net profit was $125 per acre, proves conclusively that profitable yields of sweet potatoes can be grown in South Carolina.

An average of 1,150 pounds of commercial fertilizer was used by the prize winners, the most common formula being either an 8-3-8 or an 8-3-10 (PNK), suggested by the extension horticulturists. Many other contestants, however, used different amounts of various analyses. The yields were considerably larger on the average where larger amounts of fertilizer were used. A comparison of yields where 800 pounds or more of fertilizer were used against less than 800 pounds indicates that the recommendations to use 800 to 1,000 pounds per acre were not too high. About 50 contestants used 1,100 to 1,500 pounds per acre. Records from 120 growers using 800 pounds or more show an average of 189 bushels of No. 1's, while the records of 53 growers using less than 800 pounds, show an average of 145 bushels of No. 1's.

The liberal use of potash played an important part in the production of high yields and of a high percentage of roots of the desirable "chunky" shape in greatest demand on the markets. In the Middle district 49 growers using eight per cent potash or more averaged 185 bushels of No. 1's, while 33 growers using less than eight per cent averaged 158 bushels of No. 1's. In Orangeburg county, where many sweets are grown, 16 growers using eight per cent potash or more averaged 202 bushels of No. 1's, while five growers, using less than eight per cent, averaged 151 bushels of No. 1's. All of the State prize winners except one used analyses containing 10, 12 or 15 per cent potash. It seems logical therefore to conclude that for large yields and high percentage of No. 1's a liberal amount of a good fertilizer high in potash is a first necessity.

Next in importance to liberal, intelligent fertilization should perhaps be named plenty of plants per acre. Tests having shown that close spacing commonly results in larger yields, the directors of the contest recommended rows not over 42 inches apart. A study of the results shows that in all except two cases closer spacing gave larger yields, and many of the growers writing of their experiences in the contest have referred specifically to the importance of close spacing in obtaining high yields. The re-

sults indicate that rows should be 36 to 40 inches apart, with plants spaced eight to 12 inches apart in the rows. A few growers insist that rows might be even closer than 36 inches.

Time to Plant

Early planting gave, on the average, best results, the largest yields having resulted from April and May plantings, in all except two cases, while yields from July plantings were noticeably low. The winner of the State prize planted April 15, but the winner of one of the district prizes did not plant until July 15. However, some good growers have found an objection to planting before June 1, feeling that a better quality of potatoes is obtained from somewhat later planting dates. This involves such points as shape, size, and smoothness in making a first class marketable product. Early plantings yielding more bushels per acre may also yield rough, cracked, or diseased sweets. The horticulturists believe now that in general planting should be done between May 1 and June 15.

Vine cuttings seem to have one important advantage over sprouts in that they produce a crop less likely to be diseased, and for this reason they are preferred by some growers. They should always be used, therefore, in the production of seed sweet potatoes. The vine cuttings also are said to produce roots of smoother and better finish. However, because of the lateness of the crop made from vine cuttings, the yield is often less than that from sprouts. The conclusion is naturally drawn that if early maturity or largest yield is desired, sprouts should be used instead of cuttings; if a marketable product of high quality or seed stock that is disease-free is desired, vine cuttings are to be preferred to sprouts.

Tests made at the North Carolina Experiment Station and practical experience have caused definite advice against the use of stable manure in growing sweet potatoes, the idea being that the compost causes the roots to be rough, cracked, and diseased. The South Carolina sweet potato contest results show that a good many growers used stable manure, and that especially in Horry and Lee counties, where many potatoes are grown, those using stable manure made considerably higher yields than those who did not. In two other counties the reverse was true. Noticeably bad effects seem to follow unless the manure used is well-rotted and thoroughly mixed with the soil.

The winner of the State prize used four loads of stable manure on his acre and the winner of one of the district prizes used 13 loads, and their yields are interesting: McCutcheon, the State prize winner, made 468 bushels, of which 378 bushels were No. 1's; while C. W. Galloway, a district prize winner, made 501 bushels per acre, of which 311 bushels were No. 1's. It seems safe to say that only small quantities of stable manure should be used under sweet potatoes and that it should be well-rotted and thoroughly mixed with the soil.

Suggestions for Success

A study of the South Carolina sweet potato contest leads to the following suggestions to growers especially those in southeastern States with conditions similar to those in South Carolina.

1. Use only the best seed potatoes or plants.

2. Use sprouts for earlier and larger yields, which will be of satisfactory quality except in unfavorable seasons.

3. Use vine cuttings for sure production of smooth, disease-free sweet potatoes.

4. Set plants in the field fairly early—May or first half of June.

5. Use plenty of plants—8 to 12 inches apart on rows 36 to 40 inches wide.

6. Fertilize liberally—800 to 1,000 pounds of a fertilizer high in potash.

Potatoes in England

(*From page* 44)

way between the potato hills in many of the early fields cabbage is planted. As the potatoes are dug by hand, the cabbage is not damaged and this practice gives an opportunity for two crops to be obtained from the land in one year.

The potatoes after digging are graded or "racked," as it is spoken of there. The grades differ from ours—their best potatoes being 1⅝ inches or over in size. The smaller potatoes are kept on the farm mostly for feed. This gives a larger number of potatoes in the top class.

The potatoes are sold by the ton, either being placed in cars (freight) and sent to distant markets like London, are carted in to near-by markets such as Liverpool. Many of the potatoes, however, are sold to commission men, the selling to commission men being a common practice in that country. The price of potatoes at this writing in that section is less than in this country; the average price being $13.38 for an English ton or approximately 33 cents per bushel.

When figuring the cost of potatoes with the men in that section, I found that it costs them approximately $170.00 an acre to raise potatoes. There were a few of the growers that it costs over $200 per acre up to selling. Many of the growers said that at seven tons per acre there was very little if any money in potatoes. But they do know that if they received 10 tons yield per acre and 3 pounds 10 shillings, about $17 American money per ton, that they could pay all their bills and receive pay for their own labor and other labor employed. It is readily seen that this is not unlike conditions which we have in our country.

In making up these figures, it is interesting to compare the costs of labor with some of our costs. A man for general farm work costs 35 shillings per week or $8.40. A good teamster and all-around man will cost $9 per week. Women for picking up potatoes, for cutting potatoes, hoeing, and other work on the potato field and working 49 hours per week cost as follows:

Over 21 years of age, six pence per hour—12 cents American. 18 to 21 years, 5 pence per hour—10 cents American. 16 to 18, 4 pence per hour—8 cents American.

Boys are paid from 3 pence to 6 pence per hour according to age and ability, 6 to 12 cents American money. These wages are, of course, less than our American wages. Where men, women, or boys are hired, they are not permitted to remove produce from the farm. They do not necessarily live on the farm, nor is the house, milk, firewood, or any other item furnished them. All they get is their wages.

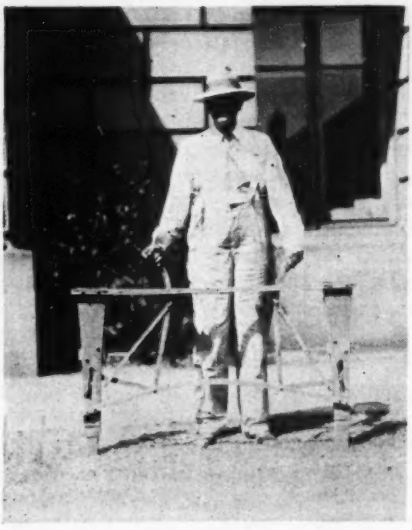
Slow Motion

(*From page* 4)

We of the bygone equine age were usually on the defensive, like the poor old family barns that have become repair shops and garages in our Midwestern towns. We were on the defensive when a new horse was purchased, and forever remained so against tangled harness, axle-grease, ammonia fumes, colic, fistula, bots and distemper. Yet how glorious the defensive, even when figuring in a

runaway episode with a fractious colt and a timid flapper of the Flora Dora vintage! Shade of De Quincey! Can any roaring motor race provide a nobler element of uncertainty or give more horrid fabric to a feverish dream than a wild colt with a tough bit?

But the kind we went sparking with were livery stable horses, trained to lather up for impatient overland drummers before the great Gideonite reform. Our own horses in the family barn had a proprietary, kindred outlook upon the calm Victorian epoch that made our relations with them far less fraught with bodily hunger, albeit subject to imposition. Our family's traveling defensive was truly one against equine imposition. Frequently there *was* no defense, except to change the subject and button up our linen dusters.



SPEEDING UP

This two-row hand corn planter was made by one of the early pioneers of Miami county, Indiana. It recently was presented to the Miami County Historical Society. The man holding the planter is Mr. E. Dutchess, Custodian of the Miami County Court House.

UNDERTAKING a journey to cousins in Watertown, thirty-five miles away, called for much detailed foresight, as well as punctuality at breakfast table on the dawn of our departure. On the day before this journey the harness was examined, the axles greased, the springs oiled, and the horse curried and well bran-mashed and bedded down against the exigencies of the Marathon. Bulky hampers of lunch, rattling tin cups, bottles of cold tea, arnica and liniment, the rope halter and the "rum" strap, wrenches and lap-robes, fly-nets and side curtains, and a bag of oats—these and other sundries engaged the stewards and hostlers against that serious venture. Why Americans ever felt a need for lessons in preparedness so late as 1917 is not for me to answer!

Preparedness for this long anticipated travel, (it might have been spelled "travail") included special dressing for the occasion. Father's kindly face had an uneasy dignity beneath the stiff, black derby which he scorned to wear at home. Mother and the girls played their courageous best in whatever little adornments their happy ingenuity and slender means afforded. Experience had taught them not to wear bonnets which crushing would utterly destroy, or fabrics that dust and mud would entirely ruin. The habiliments of the delighted small boy, perched beside Father in the front seat, little concerned him.

"WE must favor old Kit for the first ten miles until we get to Cringle's corners," was the policy laid down by Father, as he clucked to the mare and we rode past the first envious neighbor's place. No wonder the mare wiggled her ears and flung her tail over the reins at this prompt surrender to her habitual imposition. The sun was not yet above the horizon, the roads were clear of traffic, and the air was refreshing and cool. Yet Father allowed the old impostor to lag along in lackadaisical fashion until we hove in sight of Cringle's

corners. By that time the sun was scorching hot, the dust puffing up in stifling clouds, and Mother had discovered that Kit was sweating where the harness rubbed her hide.

This meant a rest for the mare under the elm tree at the foot of Gay's hill, at which time the lunch was uncovered and messed around from hand to hand. When we had crept at last over the brow of that long and sandy hill, a noisy, spark-spitting traction engine hove in sight on its way to the threshing. Out we all piled, while Father trudged on ahead leading our mare and equipage past the snorting demon over which Kit pretended such frantic alarm.

Thus we proceeded until the end of the journey, making thirty-five miles in about six hours. We became martyrs to Christian forbearance and exemplars of humane, unselfish principles. No inanimate mechanical contrivance or careless machinist could receive the blame in those days for our tardiness, our weariness, or our unkempt and grimy persons. To our hosts we explained about "slow roads," and then "washed up" for dinner.

SOMETIMES, when one of us went alone to Watertown, we took the stage. The exertion of driving old Kit, plus stabling fees, was extravagance unless the whole family participated in the alleged benefits.

The stage of the seventies and eighties inherited a flickering suggestion of the erstwhile glamor of the overland coach. This traditional spirit was manifested chiefly in the person and behavior of the driver, who was usually a retired liveryman known to every small storekeeper and farmer along the trail. Of course, the small boy rode up ahead with the driver unless there was some pretty school-ma'am on the passenger list. At such times there was no space for urchins on the front seat.

The conveyance was often a democrat wagon over which had been built a light framework covered with canvas or tarpaulin. There were two or three hard seats, listless springs, wheels with loose spokes, and some space at the rear for baggage, parcels, and the mail. The stage line usually operated a star route to carry mail for farms and hamlets, and the driver was the trusted messenger and errand boy for busy merchants and busybody old ladies.

PERHAPS the sole comfort for us when we took the stage in lieu of our own outfit was the opportunity to witness the struggles of another driver with perverse horseflesh and miserable roads. In such a position we could indulge in ironic comment because our ticket entitled us to *some* compensation. Yet the ready rejoinders of the stage driver made it uncomfortable for loquacious ones who had the temerity to "start something."

Whatever appeal the cross country stage held for the adventurous youth of those days was eclipsed by the swash-buckling careers of the hotel bus-drivers. Passengers alighting from any of our "four trains daily" found five gaudily painted side-seaters lined up at the edge of the depot platform. Two of these vehicles were "ten-cent rigs"—precursors of the jitney—"any part of the city for one dime." The drivers of the other three buses stoutly proclaimed rival "hospitalities," usually taking forcible possession of luggage and wearing apparel in delightful disregard of owners or ownership. When the disheveled spoils had been securely seized by the respective pirates of refreshment, the whole procession turned and "larruped" down the rutty streets at a speed calculated to discourage any captive guest from jumping out before his name had been scrawled on the hotel register.

The man who originated the Gideon idea of hotel reform probably first saw the light of inspiration under such circumstances. To make this memory complete, it may be recalled

that not infrequently the dapper hotel clerk, himself, rode down to the depot to meet the trains. With pointed yellow shoes, peg-top trousers, and a rose in his lapel, his presence was especially urgent when the county teachers' institute met in convention assembled. Ordinary traveling men and lyceum stars could be bundled into the narrow buses with easy dispatch, but a bevy of visiting ladies required the town's most polished professional welcome.

AT mention of professional polish as against mere crude efficiency, we stir anew old thoughts of small town funerals. We have lived through scores of them, albeit we cannot hope to maintain that record forever.

Herein lies a fundamental which marks the difference between funerals then and now. The family horses and livery turnouts were in their real element at a funeral. I recall only one instance of bad judgment with colts, which resulted in a runaway hearse. For the most part the slothful nature of our horseflesh gloried in the decorum of a processional toward the cemetery. It was, therefore, no hard task for us to maintain the dignity and slow motion fitted to the interment of a fellow townsman. But now we find it difficult to move along in solemn array, at suitable, uniform distances apart, although the successful salesmen of high-priced cars often mingle in the funereal line to demonstrate the silent "creeping" qualities of their models when geared to high speed.

Obsequies for the Respected Citizen bring to mind the welcome for the Conquering Hero—also largely an affair of stylish livery transportation, handled by the versatile drivers of the cumbrous hacks. One point of difference was the position in which the hack top was placed. Mourners demanded seclusion, a full top and curtained windows. When the rival candidates or the worthy senator arrived, down went the top so that all might bask in the radiance of his super-personality. No confusing, glassy reflections and limousine exclusiveness and hauteur hid the public servant from his crowding constituents in

A RELIC OF SLOW MOTION

This ancient plow of the vintage of 1776 is in the possession of the Emerson-Brantingham Company of Rockford, Illinois. It is one that was used at Colebrook, Connecticut, before 1780. The plowshare, which is of iron, was melted in North Coleburg by ancestors of the late Ralph Emerson who smelted some of the metal used in the guns of the patriots of the Revolution. This plow is similar to those which were abandoned in the fields near Lexington by the Minute Men when they hurriedly assembled to fire the "shot heard around the world."

those days—and nights—or torchlight fervor.

Why have political economists ignored the part played by closed cars in lowering the universal public interest in statesmen? True, the means of exit from a speaking date are swifter and more comfortable in these days, but the old chumminess and sympathy are gone.

WE possess Daniel Webster's carriage in our State museum. The height of its stilted seat from one standing at its side may be described best as a comfortable handshake. Like the oratory of that period, it was something in which to pause, to linger, and to deliberate. It also has heavy substance about it, and the hint of certainty in reaching objectives. Modern political motive apparatus runs much to gas and emergency brakes. It is easier riding on inflated tires, but the old wrought iron ones were more durable and economical. Styles in politics likewise may have changed.

Rather grudgingly we assume that the horse-drawn vehicle has had its day, except as a transporter of heavy, serious, commercial tonnages. Consequently there is a premium put upon bulky, sinewy, muscular draft horses. The cob, the pony, and the family driving horse seldom serve in their old tyrannical, temperamental way. The natty landaus and four-in-hands appear here and there in our parks, driven by those who can afford them as a luxury, like genuine antiques. More largely, however, these turn-outs are used in a hopeless professional effort to reawaken interest at some of our State fairs and stock shows in the Midwest. Our county fairs and "pumpkin shows" really know better. The big crowds look for road-burning auto races and leaps from airplanes, while the farmers' hitching posts have yielded to compressed air tanks along our court-house square.

The village blacksmith has become a vulcanizer of rubber tires and a restorer of smashed fenders. The G. A. R. travel to the cemetery on Decoration Day in silent sixes, and one by one, are mustered out to ride in our "mortuary's" motor catafalque. Our depot guests must hustle in order to catch a ride with the dignified, stoical liveried auto-bus drivers.

Most hopeless of shibboleths vainly conjured was the phrase but lately used: "Back to the buggy!" Who of any consequence, of any pretentious ambitions cares to go back to the buggy? Youth never will, and youth must make the times ahead of us. Save in some sequestered southern valleys or among tortuous mountain roads, the buggy has almost become a relic. One who indulges in retrospect about it feels almost like an antiquary.

Doubtless such things in which we elders have taken modest delight are subjects which proud youth has little inclination to ponder. Back to the buggy, indeed! Why not be practical and say "Aspire to the airplane?"

BUT I maintain that the old mare had her compensations now and then. For instance, my son cannot ever hope to find his old car mothering a brand new recreated model, while he gazes in wonder over the fact that the young thing cannot get its nose to the ground!

Though we may say that the motor era depends upon materials which are not self-renewing, even this is small consolation; for we are living in an age of motion and emotion of thrills and spills, and he who talks of conservation or conservatism is quite apt to "get the air."

We have made the final payment on the family wander wagon. How many former necessities can we transfer to the luxury class in our budget this season so that we may travel ten thousand miles without misgivings? We must camp in a car by the side of the road and be a friend to man!

Accidental

Two small boys returning to their schoolroom after recess showed evidence of having been crying.

Teacher: "Percy, why are you crying?"

Percy: "Harold kicked me in the stomach?"

Teacher: "Harold, did you mean to kick Percy in the stomach?"

Harold: "Naw, I didn't, but he turned around just as I kicked."—*Typo Graphic.*

Giles: "Fine day today, Jarge. Spring in the air."

Jarge (who is slightly deaf): "Eh?"

Giles: "I said, 'Spring in the air today.' "

Jarge: "Eh?"

Giles: "Spring in the air."

Jarge: "Why should I, why should I?"—*Kreelite News.*

"Listen, remarked the exasperated driver over his shoulder, "Lindbergh got to Paris without any advice from the back seat."

"Gracious," said the doctor, "how did you get these awful bruises on your shins. Are you a hockey player?"

"Oh, no; I just led back my wife's weak suit."

Our cat was not hygienic,
So we kicked it off the place,
Because he spat upon his feet
And wiped them on his face.

Still Going

Silas: "What's that I hear, Hiram, about your hired man falling off the roof when he was shingling the barn last week?"

Hiram: "Yeh. He fell into a barrel of turpentine."

Silas: "Did it hurt him much?"

Hiram: "Don't know. They ain't caught him yet."—*Wroe's Writings.*

Abe Martin sez: "Women an' dogs are crazy about autos, but you never saw a fox terrier jump in an' ride with jest anyone that pulls up to the curb."

She came into the police station with a photograph in her hand.

"My husband has disappeared," said she. "This is his photo," and she handed it to the inspector.

"I want him found at once," she added.

The inspector looked up from the photograph.

"Why?" he asked.

"Were you a slave, Uncle Tarr?"

"Nussah, Cuhnel; but 'bleeged to yo' for de 'terrygation, dess de same, sah. I isn't old enough. Ise been mar'd fo' times; dat's what makes me look all disintegrated dis-uh-way, sah."

City Banker (visiting the farm): "I suppose that's the hired man?"

Farmer (who had visited banks): "No, that's the First Vice-President in charge of cows."—*Exchange.*

Alabama Experiment Station averaged $8.43 in seed cotton for each $1 spent for potash

In fertilizer experiments with cotton on the six oil groups listed in the table below the Alabama Experiment Station averaged a return of $8.43 in seed cotton for each $1 spent for muriate of potash. The tests were conducted over a period of five years and are described in Bulletin 228 of the Station. The cotton was fertilized with superphosphate, nitrate of soda and muriate of potash, and returns were compiled from each of these elements. Here are the tabulated results:

SOIL GROUP	Pounds of Seed Cotton Produced Per Ton of Material			Return Per Dollar Invested		
	Superphosphate	Nitrate of Soda	Muriate of Potash	Superphosphate	Nitrate of Soda	Muriate of Potash
Highland Rim	2340	3120	6480	$11.01	$4.03	$12.96
Limestone Valleys	580	2500	3360	2.73	3.33	6.72
Appalachian Plateau	1020	3440	4480	4.80	4.59	8.96
Piedmont Plateau	520	2700	2080	2.45	3.60	4.16
Greenville	720	2740	2480	3.39	3.65	4.96
Norfork	850	2860	6400	4.00	3.81	12.80
AVERAGE	1005	2893	4213	$4.73	$3.84	$8.43

Note that muriate of potash was far in the lead both in pounds of seed cotton produced per ton of material and in return per dollar invested. In fact the combined return from $2 spent for superphosphate and nitrate of soda was $8.57 as compared to $8.43 returned by $1 spent for muriate of potash.

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Extra
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Extra Cash

"Extra potash pays extra cash" is a slogan wherever extra potash is used, at planting or as top-dressing.

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